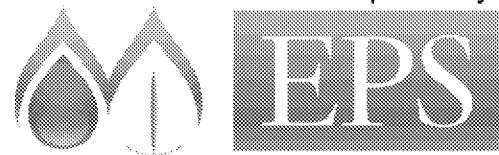


*Prepared for:*

**LCP SITE STEERING COMMITTEE**

**FEASIBILITY STUDY  
OPERABLE UNIT 3 – UPLAND SOILS  
LCP Chemicals Site  
Brunswick, Georgia**

*Prepared by:*



a Montrose Environmental Group company  
400 Northbridge Road, Suite 400  
Sandy Springs, Georgia 30350  
Tel: (404) 3015-9113

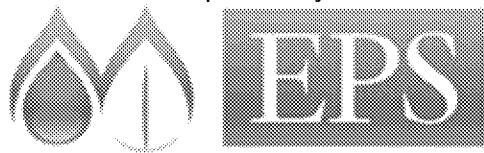
March 2019

# **FEASIBILITY STUDY OPERABLE UNIT 3 – UPLAND SOILS**

**LCP Chemicals Site  
Brunswick, Georgia**

*Prepared for:*  
**LCP SITE STEERING COMMITTEE**

*Prepared by:*



400 Northbridge Road, Suite 400  
Sandy Springs, GA 30350  
Tel: (404) 315-9113



Kirk Kessler  
Kirk Kessler, P.G.  
Senior Principal

March 2019

## FEASIBILITY STUDY OPERABLE UNIT 3 – UPLAND SOILS

**LCP Chemicals Site  
Brunswick, Georgia**

### TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	Overview .....	1
1.2	Report Organization .....	2
<b>2</b>	<b>SITE BACKGROUND.....</b>	<b>3</b>
2.1	Location and Surroundings .....	3
2.2	Past Industrial Activities .....	3
2.3	Site Features .....	4
<b>3</b>	<b>REMEDIAL ACTION OBJECTIVES.....</b>	<b>5</b>
3.1	Overview .....	5
3.2	RAOs for OU3 Soils .....	5
3.3	Refinement of Chemical-Specific Preliminary Remedial Goals .....	5
<b>4</b>	<b>HUMAN HEALTH RAO REVIEW .....</b>	<b>6</b>
4.1	Overview .....	6
4.2	Evaluation of Potential Action Areas to Address Human Health Risk .....	6
4.2.1	Review of Modeled Risk Estimates .....	6
4.2.2	Intermediate Exposure of Construction Worker to PCBs .....	8
4.2.3	Action Areas for Human Health Protection.....	9
<b>5</b>	<b>ECOLOGICAL RAO REVIEW.....</b>	<b>10</b>
5.1	Ecological RAO .....	10
5.2	Chemical-Specific Preliminary Remedial Goals .....	10
5.2.1	Overview of the OU3 Baseline Ecological Risk Assessment ("BERA") .....	10
5.2.2	COPC and Associated Remedial Goal Options .....	10
5.2.3	Selection of Preliminary Remedial Goals from the RGOs .....	11
5.3	Ecological Evaluation Process – Elements of the Review .....	12
5.3.1	Local Assessment Population Area.....	12
5.3.2	Dose-Response Relationship.....	12
5.3.3	Land Use.....	13

5.4	Site Review .....	13
5.4.1	Geographic Information System Spatial Analysis.....	13
5.4.2	Uncertainties of Mammalian Toxicity of Aroclor-1268 .....	15
5.4.3	Land Use.....	16
5.4.4	Discussion.....	17
<b>6</b>	<b>PROTECTION OF GROUNDWATER RAO REVIEW .....</b>	<b>18</b>
6.1	Protection of Groundwater RAO .....	18
6.2	Chemical-Specific SSLs.....	18
6.2.1	Baseline Leaching CPOC and Assessment Process .....	18
6.2.2	Site-specific SSLs .....	19
6.2.3	Derivation of the Site-Specific DAF .....	19
6.2.4	Site-Specific Fraction of Organic Carbon .....	22
6.2.5	Summary of Calculated SSSLs .....	22
6.3	Vadose Zone Soil Data Selection .....	23
6.4	SSL Modeling and Assessment in Context of the CSM .....	23
6.4.1	Perspectives on SSL Modeling .....	23
6.4.2	Alternative Causation of COPCs in Groundwater.....	25
6.5	Soil-Groundwater Comparative Analysis of Soil-to-Groundwater SSSL PRGs .....	26
6.5.1	Arsenic .....	26
6.5.2	Lead .....	26
6.5.3	Mercury .....	28
6.5.4	Naphthalene .....	29
6.6	Protection of Groundwater Summary.....	30
<b>7</b>	<b>IDENTIFICATION AND EVALUATION OF RESPONSE ACTIONS .....</b>	<b>32</b>
7.1	Overview .....	32
7.2	Description of RAAs .....	32
7.2.1	Remedial Action Alternative 1 (RAA1): No Further Action .....	32
7.2.2	Remedial Action Alternative 2 (RAA 2): No Further Action with Institutional Controls.....	32
7.3	Evaluation Criteria for Remedial Action Alternatives.....	33
7.4	Evaluation of Remedial Action Alternatives .....	34
7.4.1	Remedial Action Alternative 1 (RAA1): No Further Action .....	34
7.4.2	Remedial Action Alternative 2 (RAA2): No Further Action with Institutional Controls.....	34
7.5	Discussion of Alternatives .....	35
<b>8</b>	<b>REFERENCES .....</b>	<b>36</b>

## LIST OF FIGURES

- Figure 2-1 Site Location  
Figure 2-2 Human Health Risk Assessment Exposure Units (Quadrants)  
Figure 4-1a Glynn County, Georgia Zoning  
Figure 4-1b Glynn County, Georgia Future Land Use Map  
Figure 5-1 Grid Layout for Spatial Analysis  
Figure 5-2 Ecological Exposure Review Setup  
Figure 5-3a Ecological Exposure Review Evaluation - Mercury  
Figure 5-3b Ecological Exposure Review Evaluation – Total PCB  
Figure 5-3c Ecological Exposure Review Evaluation – Lead  
Figure 5-4 Mercury Hot Spots  
Figure 5-5 Panel View of Aroclor 1254, 1260, and 1268 in Surface Soil  
Figure 6-1 Iterative Review of Soil Lead  
Figure 6-2 Iterative Review of Soil Mercury  
Figure 6-3 CBP Profile and Alkaline Impoundments  
Figure 6-4a Site Groundwater 2012 pH Profile  
Figure 6-4b Site Groundwater 2012 ORP Profile  
Figure 6-5 Petroleum Hydrocarbon Source Areas  
Figure 6-6a Comparison of Vadose Zone Soil Arsenic to SSSL  
Figure 6-6b Comparative Review of Vadose Zone Soil Arsenic & Groundwater  
Figure 6-7a Comparison of Vadose Zone Soil Lead to SSSL  
Figure 6-7b Comparative Review of Vadose Zone Soil Lead & Groundwater  
Figure 6-8a Comparison of Vadose Zone Soil Mercury to SSSL  
Figure 6-8b Comparative Review of Vadose Zone Soil Mercury & Groundwater  
Figure 6-9a Comparison of Vadose Zone Soil Naphthalene to SSSL  
Figure 6-9b Comparison of Saturated Zone Soil Naphthalene to SSSL  
Figure 6-9c Comparative Review of Saturated Zone Soil Naphthalene & Groundwater

## LIST OF APPENDICES

- Appendix A Construction Worker Risk Calculations Quadrant 4 and ProUCL output  
Appendix B Construction Worker Risk Calculations Adjusted for Intermediate Oral Exposure to PCBs  
Appendix C Evaluation of Grid Groupings for Ecological Exposure  
Appendix D Time-Dependent Dose-Response Analysis in Derivation of Preliminary Remedial Goal for Inorganic Mercury  
Appendix E Evaluation of Hot Spots for Ecological Exposure

# 1 INTRODUCTION

---

## 1.1 Overview

Honeywell International Inc. ("Honeywell"), the Atlantic Richfield Company ("Arco"), and Georgia Power Company ("GPC") are responsible parties ("RPs") to an Administrative Order by Consent ("AOC"), USEPA Docket No.: 95-17-C requiring a Remedial Investigation/Feasibility Study ("RI/FS") of the LCP Chemical Site located in Brunswick, Georgia ("Site").

The upland soils portion of the Site is designated as Operable Unit 3 ("OU3"). Prior to 2006, the upland and estuarine portions of the Site were designated as a single unit, Operable Unit 1 ("OU1"). The United States Environmental Protection Agency ("USEPA") requested in 2006 that upland soils and LCP estuary be divided into two separate operable units (USEPA, 2006). The estuarine portions of the Site are now referred to as OU1, while the upland soils are designated as OU3. The groundwater (and soils beneath the former Cell Building) at the Site are designated as Operable Unit 2 ("OU2").

In the mid-1990s, based on multiple sampling programs to assess Site conditions, approximately 130,000 cubic yards of contaminated soil and waste in the upland setting were excavated and disposed off-site as part of a time-critical removal action. Since that time, five additional sampling programs for the upland soils have been completed at the Site.

A Remedial Investigation ("RI") Report, encompassing a Human Health Baseline Risk Assessment ("HHBRA") (EPS, 2012) and Baseline Ecological Risk Assessment ("BERA") (CDR and EPS, 2010), has been completed for OU3 and approved by the USEPA (EPS, 2013a). The RI presented an overview of the Site's history, background and setting, a narrative of Site activities (industrial and manufacturing) and a conceptual site model ("CSM"). A Technical Memorandum entitled Draft Development and Screening of Remedial Action Alternatives Operable Units 3 – Upland Soils ("Draft OU3 FS Tech Memo") (EPS, 2013b) was submitted to the USEPA in April 2013. The USEPA provided comment on the Draft OU3 FS Tech Memo on July 31, 2018 and requested revisions and updates to the document to capture additional Site monitoring and risk evaluation performed since submission of the Draft OU3 FS Tech Memo. The revised memorandum (EPS, 2018) was submitted to USEPA in September 2018. The USEPA provided comment on the revised memorandum on December 6, 2018. Based on a discussion with the EPA February 6, 2019, EPA has requested that the RPs submit an FS addressing comments as appropriate on the latest draft of the FS Tech Memo.

## 1.2 Report Organization

The report is organized as follows:

- Section 2: Site Background and History;
- Section 3: Remedial Action Objectives;
- Section 4: Human Health RAO Review;
- Section 5: Ecological Receptors RAO Review;
- Section 6: Protection of Groundwater RAO Review;
- Section 7: Identification and Evaluation of Response Actions; and
- Section 8: References.

## 2 SITE BACKGROUND

---

### 2.1 Location and Surroundings

The Site property occupies approximately 813 acres immediately northwest of the City of Brunswick, Glynn County, Georgia (Figure 2-1). Tidal marshland comprises about 670+ acres of the property. The primary upland at the Site where manufacturing operations at the LCP Site occurred, is located on approximately 133.5 acres of upland area, east of the marsh and bordered by a county land disposal facility and a pistol firing range on the north, Ross Road on the east, the Turtle River and associated marshes to the west, and Brunswick Cellulose to the south. The Arco refinery also utilized land to the east of Ross Road for product storage in four above ground storage tanks. A separate land parcel of the LCP site property located approximately one-half mile from the primary uplands parcel along the Turtle River, known as the Salt Dock, was also evaluated as part of the RI.

### 2.2 Past Industrial Activities

Arco operated as a petroleum refinery on the Site from 1919 to the early 1930s. At one time, over 100 process and storage tanks were present on Site. The refinery was fueled by coal until 1922, after which oil was used as fuel. The refinery ceased operations by 1935. Concrete tank supports and numerous buildings from this time period remain at the Site. Much of the steel was salvaged for scrap in World War II or moved to other locations (GAEPD, 1990).

GPC purchased portions of the Site in 1937, 1942, and 1950. These purchases included two parcels of land and two 750 kilowatt ("kW") electric generators from Arco. GPC subsequently added an additional 4.0 megawatts of electric generation capacity at the Site. Thus, power generation capacity increased at the Site from 1500 kW in 1937 to 5500 kW by 1941. Bunker C oil was used as the fuel source for the power plant (GAEPD, 1990).

The Dixie Paint and Varnish Company operated a paint and varnish manufacturing facility at the Site from 1941 to 1955 on a portion of the Site property south of GPC's parcel. The Dixie Paint and Varnish Company became the Dixie O'Brien Corporation and eventually a wholly owned subsidiary of the O'Brien Corporation (GAEPD, 1990).

In 1955, after acquiring almost all the land constituting what is now known to be the Site, Allied Chemical and Dye Corporation established and operated a chlor-alkali facility, principally for the production of chlorine gas, hydrogen gas, and caustic solution. The plant operated using the mercury cell process, which involves passing a concentrated brine solution between stationary graphite or metal anode and a flowing mercury cathode to produce chlorine gas, sodium hydroxide (caustic) solution, and hydrogen gas, as a by-product. Sodium hypochlorite (bleach) was also produced in a secondary reaction.



LCP Chemicals, Inc. (“LCP”) purchased the property and the chlor-alkali plant in 1979. The chlor-alkali process continued with modification following the purchase. Part of the modification included the production of hydrochloric acid by reacting chlorine and hydrogen. Manufacturing operations continued until February 1994, when LCP’s corporate headquarters shutdown the plant and LCP went into bankruptcy. Honeywell repurchased the property in 1998 and currently owns the property, except for a portion of the property in the northeast portion of the Site that was sold to Glynn County in 2012 for redevelopment and the Salt Dock parcel (separate parcel to southwest) sold to Koch Cellulose. Honeywell also purchased the GPC parcel in approximately 2016.

## 2.3 Site Features

The dominant physical feature of the property is the large expanse of tidal marsh located in the western areas of the Site. The salt marsh is characterized by a flat, heavily vegetated surface (approximate elevation of 2 to 3 feet (“ft”) above mean sea level ("amsl")) dissected by numerous channels and larger creeks under tidal influence from the nearby Turtle River.

The upland area to the east of the marshland is characterized by gently sloping terrain ranging from approximately 5 ft amsl along the marsh/upland border to an elevation of approximately 15 ft amsl along Ross Road. This area of the Site is roughly divided in half (north/south) by the east-west entrance road (B Street), which transitions into the causeway road where B Street ends at the marsh-upland border and extends to Purvis Creek. The upland portion of the Site is also roughly divided in half (east/west) by a fence line separation of the land used in former industrial operations and land primarily used for non-industrial operations (office and storage facilities). These natural property breaks developed into geographic quadrants used as Exposure Units in the HHBRA (Figure 2-2).

# 3 REMEDIAL ACTION OBJECTIVES

## 3.1 Overview

Remedial Action Objectives (“RAOs”) are Site-specific clean-up objectives established for protecting human health and the environment. RAOs specify contaminants and media of concern, potential exposure pathways and receptors, and acceptable contaminant level or range of levels. Since protection of human and ecological receptors may be achieved by reducing or eliminating exposure pathways as well as by reducing contaminant concentrations, RAOs provide for both a contaminant level and exposure route, and may rely on both approaches to manage risk, rather than a singular approach. The RAOs for this technical memorandum are based on the assessments of the HHBRA, BERA, and Site conditions as provided in the RI Report.

The following sections provide an assessment and refinement of RAOs to be applied to identify potential remedial action areas. RAOs based on contaminant concentration and exposure routes based on remedial goal options (“RGOs”) from the HHBRA and BERA, and soil screening levels (“SSLs”) for potential leaching of soil constituents for groundwater.

## 3.2 RAOs for OU3 Soils

RAOs for OU3 soils are provided in the following table.

Receptor	Remedial Action Objective
Human Health	Prevent human exposure to constituents of potential concern (“COPCs”) in soil that exceed EPA’s acceptable cancer risk range of 1E-4 to 1E-6, and non-cancer hazard indices that exceed 1.
Ecological	Reduce COPCs in surface soils to lowest observable adverse effects levels (“LOAEL”) for reproductive risks to small mammals exposed to surface soils.
Protection of Groundwater	Protect groundwater from COPCs leaching from soils in the vadose zone to levels impacting groundwater.

## 3.3 Refinement of Chemical-Specific Preliminary Remedial Goals

Chemical-specific preliminary remedial goals (“PRGs”) for OU3 soils are provided in the following sections in a detailed review of each RAO. The chemical-specific PRGs are derived from modeled risk as provided in the approved HHBRA and BERA, and evaluation of Site soils with regard to their potential to leach to groundwater. PRGs are refined herein by consideration of Site-specific conditions, exposure, and identified uncertainties.

# 4 HUMAN HEALTH RAO REVIEW

---

## 4.1 Overview

Glynn County has the Site zoned as Basic Industrial (“BI”) as shown on Figure 4-1a. The County also shows the Site as being designated for industrial future use as shown on Figure 4-1b. In addition to zoning controls, Honeywell (current land owner) has no intention of converting any portion of the property to residential use, and this restriction as part of any sale in the future will be recorded (*i.e.*, deed restriction) to prevent such use. Therefore, the review of the human health RAO focuses on protection involving non-residential land use exposure.

Risk estimations were performed according to a “reasonable maximum exposure” (“RME”) and for a “central tendency exposure” (“CTE”), consistent with USEPA Region 4 guidelines. RME utilizes more conservative assumptions regarding the exposure and therefore USEPA Region 4 considers RME as the basis for remedial decisions (USEPA, 2000).

## 4.2 Evaluation of Potential Action Areas to Address Human Health Risk

### 4.2.1 Review of Modeled Risk Estimates

A summary of risk estimates from the HHBRA for the Site Worker scenario and a review of the analytical data driving those risk estimates for each exposure unit are provided below. Given future Site land use will restrict against residential use, the risk summary provided herein is limited to non-residential exposure. For reference, a summary of risk estimates for a residential use is provided in Table 26 and Appendix B of the approved HHBRA (EPS, 2012)<sup>1</sup>.

The HHBRA presents risk estimates from two underlying data sets. In one case, all data records generated for the Site were used which included data records produced by the TEG on-site laboratory used for the early phase of the upland removal response action. Serious data quality issues resulting in a high-concentration bias to the reported results were identified at that time<sup>2</sup>. For this reason, TEG was replaced by another laboratory QAL for the remainder of the removal action. The remainder of the OU3 data records were generated by other off-site commercial laboratories. More than an adequate amount of data records exists to characterize the site soil condition without using the TEG data. Thus, the HHBRA also presented a complete risk assessment limited to the QAL and offsite commercial laboratories data.

---

<sup>1</sup> Residential land use exposure as presented in the HHBRA results in a HI ranging from 4-15 for various Quadrants, and an ELCR as high as  $10^{-4}$  for Quadrant 4.

<sup>2</sup> See memorandum from Kirk Kessler (EPS) to Galo Jackson (USEPA) dated February 11, 2010 providing a full description with supporting attachments of the TEG laboratory quality issues (EPS, 2010).

Given the above, it is appropriate to review the condition herein on the basis of the QAL and offsite commercial laboratories data. Below is a summary of the computed hazard index (“HI”) and excess lifetime cancer risk (“ELCR”) estimates from the risk assessment.

Quadrant	Site Worker		Excavation Worker	
	HI <sup>3</sup>	ELCR	HI <sup>3</sup>	ELCR
1	0.1	3E-06	0.2	2E-07
2	0.4	1E-05	0.8	6E-07
3	0.9	1E-05	1	4E-07
4	0.9	3E-05	2	1E-06

#### Quadrant 1

No data gaps or significant uncertainties are identified for Quadrant 1. Past remedial actions included a shallow surface soil removal in the southern portion of Quadrant 1 where raw brine storage occurred<sup>4</sup>. The baseline (*i.e.*, post-removal action) HI and ELCR estimates for Quadrant 1 are less than threshold criteria.

#### Quadrant 2

During the 1994-97 removal response action, the Quadrant 2 work was limited to a discrete excavation at the hydrogen line metering station at the southeastern edge of the quadrant. The low level of removal activity in Quadrant 2 reflects the area’s primary use as administrative support for past industrial activities that were conducted in other areas of the Site. The baseline (*i.e.*, post-removal action) HI and ELCR estimates for Quadrant 2 are less than threshold criteria.

#### Quadrant 3

Quadrant 3 was subjected to extensive excavation and backfill during the 1994-97 removal response action. As a result, Quadrant 3 soils are abundantly characterized, with many of the samples that comprise the Quadrant 3 soils dataset having been collected from sidewalls or bottoms (often sloped surfaces) of excavated areas. The baseline (*i.e.*, post-removal action) HI and ELCR estimates for Quadrant 3 are less than threshold criteria, even without accounting for large areas of clean backfill (*i.e.*, accounting for the clean backfill would have resulted in a lower exposure point concentration (“EPC”) for the COPCs and thus a lower estimate of risk).

#### Quadrant 4

Quadrant 4 was also subjected to extensive excavation/backfill actions during the 1994-97 removal response action. As a result, Quadrant 4 soils are abundantly characterized. The HI for the Excavation Worker exposure exceeded unity in the calculations made in the HHBRA, driven by results from two sample locations (LC-204 and LC-639) from an early phase of 5-point composite sampling by the USEPA contractor that reported an anomalously high Aroclor 1260 concentration,

---

<sup>3</sup> HI values shown in the embedded table were based on the Aroclor 1016 RfD as a surrogate for Aroclor 1268 toxicity.

<sup>4</sup> In addition to soil removal and backfill, a separate area of raw brine muds received a soil cover. The condition beneath the soil cover was included in all risk calculations in the HHBRA, as if the cover was not present.

not supported by abundant grab sample data in the immediate vicinity of these sample locations. These two locations contributed approximately 50% to the overall HI estimation. Because of the uncertainties with these two locations, this area was re-sampled for Aroclors in August 2018.

Re-sampling at these locations returned a reported Aroclors result orders of magnitude below the prior reporting (see table below).

	Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268		Total PCB	
	Prior	New	Prior	New	Prior	New	Prior	New	Prior	New
LC-204 (0-1ft)	ND	ND	110	ND	NA	0.094	NA	0.083	110	0.177
LC-639 (0-1ft)	6.9	ND	160	ND	NA	1.25	NA	1.54	166.9	2.79
LC-639 (1-2ft)	9.2	ND	120	ND	NA	0.112	NA	0.111	129.2	0.223
	ND	not detected			all units in mg/kg					
	NA	not analyzed								

We note that these new results are consistent with other sample locations in the vicinity. USEPA agreed the prior results should be replaced with the new results.

EPCs were re-calculated employing the new sample results to examine the effect of the updated EPCs on the Quadrant 4 HI for the Excavation Worker scenario, utilizing the same toxicity and exposure factors from the HHBRA. The resultant calculation returns an HI slightly less than 1 (rounds “up” to unity or 1), or below USEPA’s threshold level. Appendix A provides the applicable worksheets from the HHBRA used in this calculation, followed by the ProUCL output files used to develop the EPC values.

#### 4.2.2 Intermediate Exposure of Construction Worker to PCBs

EPA’s comment letter on the revised FS Tech Memo identified a toxicity value for intermediate exposure to PCBs that had not been used in the HHBRA<sup>5</sup>. The Agency for Toxic Substances and Disease Registry (“ATSDR”) recently recommended Minimal Risk Levels (“MRLs”)<sup>6</sup> for multiple or continuous oral exposures to PCBs lasting for no more than 1 year of 0.00003 mg/kg-day (ATSDR, 2018). Given that risk to an excavation worker is evaluated over a 6-month exposure period, estimates of the HI and ELCR for the construction worker were amended applying the intermediate exposure MRL for PCBs; these estimates are summarized in the table below. Note that estimates for Quadrant 4 are based on EPCs re-calculated employing the new results for LC-204 and LC-639. Appendix B provides the applicable worksheets used in this calculation. The resultant calculation returns estimates of HI less than or equal to 1 for the four quadrants, below USEPA’s threshold level of unity.

<sup>5</sup> Calculations in the HHBRA were performed using the EPA chronic reference doses (“RfD) for PCBs of 0.00002 mg/kg-day not directly applicable to an intermediate exposure duration of a construction worker.

<sup>6</sup> MRLs are synonymous with EPA reference doses (“RfDs”).

Quadrant	Excavation Worker	
	HI <sup>7</sup>	ELCR
1	0.2	2E-07
2	0.7	6E-07
3	1	4E-07
4	0.9	9E-07

#### 4.2.3 Action Areas for Human Health Protection

The more detailed evaluation of human exposure presented herein supports a conclusion that no further action is necessary for the Site, under a non-residential land use limitation.

---

<sup>7</sup> HI values shown in the embedded table are based on the Aroclor 1016 RfD as a surrogate for Aroclor 1268 toxicity

# 5 ECOLOGICAL RAO REVIEW

---

## 5.1 Ecological RAO

As described in Section 3.2, the ecological RAO is to reduce COPCs in surface soils to levels protective of reproductive risks to local populations of birds and mammals.

## 5.2 Chemical-Specific Preliminary Remedial Goals

### 5.2.1 Overview of the OU3 Baseline Ecological Risk Assessment (“BERA”)

The OU3 BERA used food-web models to evaluate potential adverse effects to avian and mammalian terrestrial wildlife (CDR and EPS, 2010). Daily intakes of the primary COPCs (*i.e.*, lead, mercury, and Aroclor-1268), based on the mean and maximum measured concentrations in samples of soil and food items, were calculated and then compared to a dietary toxicity reference value (“TRV”) specific to each COPC and wildlife guild. TRVs based on no observed adverse effects levels (“NOAELs”) and LOAELs were used to generate hazard quotients (“HQs”). A total of 15 assessment endpoints were examined in the BERA and the potential risk to wildlife exposed to the site condition was quantitatively assessed. The BERA judged moderate risks to small mammal populations from exposure to Aroclor-1268 and inorganic mercury in soils. Further evaluation of small mammal exposure to Aroclor-1268 and inorganic mercury is presented herein.

### 5.2.2 COPC and Associated Remedial Goal Options

The OU3 BERA involved a comprehensive evaluation of HQs for the ecological COPC (mercury, Aroclor 1268, and lead) for each of the assessment endpoints (Table 11 of the BERA). All combinations of wildlife and COPC modeled to exhibit  $HQ > \text{unity}$  were further evaluated in the BERA by a back-calculation of RGOs in a “Nodal” approach, that creates a matrix of potential remedial goals across the nodal spectrum from the NOAEL to the LOAEL (Charters and Greenburg, 2004) (Table 12 of the BERA). The table below is re-created from Table 12 of the BERA.

Wildlife Receptor	HQ Nodal Number						
	1	2	3	4	5	6	7
	NOAEL			GMAEL			LOAEL
<b>Total Mercury (mg/kg) - based on Methyl Mercury Exposure</b>							
broad-winged hawk <sup>(1)</sup>	3.5/1.7	4.2/2.0	5.0/2.4	5.9/2.9	7.1/3.5	8.5/4.2	10.0/5.0
long-tailed weasel	5.3	6.0	6.8	7.6	8.6	9.8	11.0
<b>Total Mercury (mg/kg) - based on Inorganic Mercury Exposure</b>							
mourning dove	0.7	1.1	1.8	3.0	4.8	7.9	13.0
short-tailed shrew	2.8	2.8	2.8	2.8	2.8	2.8	2.8
<b>Aroclor 1268 (mg/kg) - based on Aroclor 1254 TRV</b>							
short-tailed shrew	0.2	0.3	0.5	0.7	1.0	1.4	2.1
long-tailed weasel	0.6	0.9	1.3	1.9	2.8	4.1	6.0
<b>Lead (mg/kg)</b>							
mourning dove	135	160	190	230	280	330	400
short-tailed shrew	240	350	520	760	1100	1600	2400

(1) values differ based on assumption of 50% vs. 100% MeHg/Hg ratio in small mammal food

### 5.2.3 Selection of Preliminary Remedial Goals from the RGOs

Input variables representing the conservative end of available data distributions are typically mandated in the conduct of ecological risk assessment on Superfund sites (Tannenbaum, 2005; Hope, 2006; Hope 2012; Allard *et al.* 2010; Mayfield *et al.* 2014). The cumulative effect of these conservative choices results in low PRGs and amplified estimates of potential harm to ecological receptors. Given the conservative inputs applied in the BERA, PRGs based on LOAEL endpoints are most applicable for evaluation of population-level effects. Use of LOAEL endpoints in evaluation of population-level effects is supported by a consortium of scientists and State and Federal regulators, including Washington Department of Ecology, Oregon Department of Environmental Quality, U.S. Fish and Wildlife Service, and USEPA Region 10 (ODEQ, 2017)<sup>8</sup>. Accordingly, the values based on the LOAEL endpoints were selected from the RGOs as PRGs for evaluation of the Site condition with respect to the ecological RAO. LOAEL PRGs are provided in the table below (in units of mg/kg). LOAEL PRGs protective of the most sensitive receptor are used to identify areas for a refined evaluation of potential adverse effects to ecological receptors in later sections of this document.

<sup>8</sup> The ODEQ Technical Workgroup Report is not USEPA Region 4 formally adopted guidance. However, it is considered technically sound and represents contemporary application of ecological risk assessment protocols from a cross section of State and Federal agencies.

	Most Sensitive Receptor		Least Sensitive Receptor	
	PRG	Basis	PRG	Basis
<b>Mercury</b>	3	LOAEL-shrew	13	LOAEL-dove
<b>PCB</b>	2	LOAEL-shrew	6	LOAEL-weasel
<b>Lead</b>	400	LOAEL-dove	2400	LOAEL-shrew

## 5.3 Ecological Evaluation Process – Elements of the Review

### 5.3.1 Local Assessment Population Area

Effects to a local-area population are not simply a matter of the chemical condition; rather, it is a matter of the home range of the wildlife guild and the geographic scale of the chemical condition exceeding the LOAEL-based concentration. Animals move about their home range in pursuit of resources (*i.e.*, food and water), shelter, and mates, and experience (or do not experience) exposure in various portions of their home range based on time spent and behavior engaged in each area. The size of an animal's home range may vary based on the availability of resources (Aliaga-Rossel *et al.* 2008; Borowski 2003; Hubbs and Boonstra 1998; Jonsson *et al.*, 2002; Lira *et al.*, 2007), seasonality (Getz and McGuire 2008; Getz *et al.*, 2005), habitat type (Getz and McGuire 2008), population density (Abramsky and Tracy 1980), and age of the individual (Fernandes *et al.*, 2010). The home range of the short-tailed shrew averages approximately 1-acre (USEPA, 1993) but may be larger based on these factors. Adult mourning doves feed and rest at areas located considerable distances from nested sites: up to 4.5 miles for males and 3.3 miles for females (Sayre *et al.*, 1980). This supports the use of area groupings of Site data larger than 1-acre in the evaluation of risk to local populations of wildlife.

The ODEQ Technical Workgroup Report (ODEQ, 2017) advances the concept of Local Assessment Population Area (“LAPA”), derived by combining the overlapping home ranges of a population to appropriately assess the effect of a condition on a population and not the individual, thus representing the minimum land surface area that can sustain a healthy population in absence of any stressors. The evaluation of potential action areas for ecological protection presented in Section 5.4.1 is conservatively based on the LAPA of the wildlife guild with the smallest home range (denoted by the short-tail shrew), for each COPC. The ODEQ Technical Workgroup Report provides that a LAPA of 4-5 acres is appropriate for the shrew (ODEQ, 2017).

### 5.3.2 Dose-Response Relationship

The USEPA provided comment on the 4-acre LAPA analysis in the revised draft of the FS Tech Memo (letter dated on December 6, 2018) identifying limited areas (hot spots) exhibiting an inorganic mercury soil condition that may potentially pose an unacceptable risk to infrequently exposed small mammal populations (further described in Section 5.4.1.2). This judgement is based

on the dose-response characteristics of inorganic mercury induced reproductive effects or changes in body weight in small mammals. Dose-response relationships are inherently inclusive of the underlying mechanisms of toxicity (*i.e.*, chemical form, exposure pathway, reaction of the toxicant with the target receptor molecule, cellular dysfunction and resultant toxicity, and reinforcement or weakening of effects with time) and species physiology in estimation of whether a defined biological response will occur as a result of a certain level (duration and amount) of exposure. Adverse responses to COPCs that affect mortality and reproduction are considered drivers for population persistence, growth, or decline (USEPA, 2005).

### 5.3.3 Land Use

The Site is zoned commercial/industrial, and it is important to recognize land use designation in the ecological risk assessment process. The Site is nestled within an active commercial/industrial area and portions of the Site property have already been returned to productive commercial use (Glynn County Sheriff's Office and Detention Center was opened on October 2, 2014). Additionally, the ODEQ Technical Workgroup Report advocates excluding ecological risk assessment process at sites that are zoned commercial/industrial where there is a reasonable likelihood of future commercial/industrial development.

## 5.4 Site Review

### 5.4.1 Geographic Information System Spatial Analysis

#### 5.4.1.1 Evaluation Based on 4-acre LAPA

The evaluation of potential action areas for ecological protection is completed with respect to the LAPA of the wildlife guild and the geographic scale of the chemical condition exceeding the LOAEL-based concentration range. A geographic scale of 4 acres was applied to the Site evaluation and is considered the minimal land surface area for the shrew LAPA to support a healthy population. The configuration of the 4-acre grid system was simply assembled based on the prior 1-acre grid system presented in the Remedial Investigation Report (EPS, 2013a), by grouping of four adjacent 1-acre grids as shown on Figure 5-1<sup>9</sup>. The evaluation of potential action areas for ecological exposure is performed for each 4-acre grid. The underlying data set used in the evaluation excluded a select set of sample locations where ecological exposure is not occurring such as excavation sidewall samples bordering building foundations and the cell building soil cover (as described in Appendix C, pages C-2 and C-3 of the approved OU3 RI Report)<sup>10</sup>.

Two levels of data treatment were applied in this grouped grid analysis. The first data treatment accounts for the percentage of the 4-acre grid grouping containing clean backfill<sup>11</sup>. The second data treatment is inclusive of the low-quality habitat areas of the Site associated with buildings,

<sup>9</sup> Grid grouping was limited to those areas of the Site where one or more of the ecological COPCs exceed the low end of the PRG range.

<sup>10</sup> Note that sample locations LC-204 and LC-649 were excluded from the RI Appendix C analysis. The locations were re-sampled in September 2018 and the results are incorporated into the ecological review presented herein.

<sup>11</sup> This methodology was employed in the approved OU3 RI Report, Appendix C.

concrete pad foundations, and access roads (Figure 5-2). The presence of these structures diminishes habitat viability and reduces exposure for ecological receptors. Furthermore, the construction of these Site features predates the use of mercury and PCBs at the Site as they were built for the refinery; there is no transport mechanism for mercury or PCBs to occur in the shallow soil underlying these structures. The modification of each 4-acre grid due to Site-specific attributes is simply accounted for by determining the percentage of the 4-acre area that is clean backfill and low-quality habitat to determine an adjusted weighted average soil concentration. The calculation of the grid-specific weighted average is provided in Appendix C.

The table below summarizes the results of the analysis of grouped grids for mercury, PCBs, and lead. The table compares the results to the respective PRG ranges identified in Section 5.2. Following the table is a summary description of each constituent result.

Grid Group	Mercury (mg/kg)		Total PCBs		Lead (mg/kg)	
	Accounts for Backfill	Accounts for Backfill & Infrastructure	Accounts for Backfill	Accounts for Backfill & Infrastructure	Accounts for Backfill	Accounts for Backfill & Infrastructure
1	0.8	0.8	0.1	1	346	346
2	2	2	0.6	0.6	87	87
3	2	2	0.4	0.4	103	103
4	3	3	0.2	0.2	38	38
5	<b>7</b>	<b>7</b>	0	0	84	84
6	2	2	0.3	0.3	48	48
7	2	2	1	1	42	40
8	2	2	2	2	17	17
9	1	1	0.8	0.8	34	34
10	1	0.9	0.6	0.4	71	54
11	<b>5</b>	2	<b>4</b>	1	87	29
12	<b>5</b>	<b>4</b>	0.8	0.7	63	60
13	1	1	1	0.9	106	93
14	<b>4</b>	3	2	2	139	106
15	<b>7</b>	<b>7</b>	0	0	45	45
16	0.5	0.5	0	0	162	162
17	2	2	0	0	223	223
18	0.6	0.6	0	0	272	272

Notes: bold font denotes grouped grid exceeding PRG

#### 5.4.1.1.1 Mercury

The small mammal LOAEL PRG for mercury is 3 mg/kg. The mercury results for each grid grouping are illustrated in Figure 5-3a. Five of the grid groupings exceed the PRG (5, 11, 12, 14, and 15) when accounting for clean backfill. Grid groupings 11 and 14 drop below the PRG when also considering the industrialized habitat (*i.e.*, hardscape). Grid group 5 is located in the southeastern portion of Quadrant 2, which is distant from the cell buildings and general manufacturing areas of the Site. This area had less sample density and the average of 7 mg/kg is driven by a small number of samples in this grid and is not likely representative of the overall area.

Grid group 12 encompasses a portion of the soil cover over Cell Building 1 (clean soil) and areas along roads and other building foundations – the latter areas exhibit the higher mercury condition driving the average result but represent poor quality ecological habitat. Grid group 15 is in Quadrant 1 in the area of former raw brine storage – this area is further evaluated in Section 5.4.1.2 in regards to infrequent exposure to “hot spots”.

#### 5.4.1.1.2 Total PCBs

The LOAEL PRG for total PCBs is 2 mg/kg. The total PCB results for each grid grouping are illustrated in Figure 5-3b. Grid Grouping 11 exceeds the PRG when accounting for clean backfill but drops below the PRG when also considering hardscape.

#### 5.4.1.1.3 Lead

The LOAEL PRG for lead is 400 mg/kg. The lead results for each grid grouping are illustrated in Figure 5-3c. None of the eighteen grid groupings exceed the PRG for lead.

#### 5.4.1.2 Small Mammal Infrequent Exposure to Mercury Hot Spots

The USEPA provided comment on the 4-acre LAPA analysis in the revised draft of the FS Tech Memo (letter dated on December 6, 2018) identifying hot spots (groupings of two or more sample locations) exhibiting an inorganic mercury soil condition that may potentially pose an unacceptable risk to infrequently exposed small mammal populations (shown on Figure 5-4)<sup>12</sup>. Hot spots are characterized in the EPA comment letter as a condition with two (or more) contiguous samples exhibiting a condition above a LOAEL-based PRG for infrequent exposure of 14 mg/kg. The infrequent exposure PRG is derived from the dose-response characteristics of inorganic mercury induced reproductive effects or changes in body weight in small mammals, as described in Appendix D.

The evaluation of potential action for each hot spot comprised of a comparison of the volume weighted-average soil concentration within the top 2 feet of the soil column to the infrequent exposure PRG (14 mg/kg). The weighted-average accounts for the percentage of the hot spot containing clean backfill and soil cover. The two hot spots exhibit a volume-weighted average mercury concentration of 6.1 mg/kg and 10.1 mg/kg, respectively, below the 14 mg/kg infrequent exposure PRG (calculation of the grid-specific weighted average is provided in Appendix E).

#### 5.4.2 Uncertainties of Mammalian Toxicity of Aroclor-1268

The OU3 PCB condition is largely comprised of Aroclor 1268. Figure 5-5 is a panel of the Aroclor 1254, Aroclor 1260 and Aroclor 1268 condition in the surficial soil<sup>13</sup>. Aroclor 1254 detections are

<sup>12</sup> The first hot spot encompasses a portion of Grid Grouping 11 west adjacent of the former cell building area and the second is the former Brine Tank Area located in Grid Grouping 15. A third area was identified by USEPA; however, the evaluation performed by USEPA included deeper soil samples beyond the depth of ecological exposure as specified in the BERA and RI (*i.e.*, D1<1 and D2≤2), and included samples intentionally omitted from the RI; the third area did not meet the USEPA criteria for a hot spot when the correct data set was applied.

<sup>13</sup> Confirmation samples collected for LC-204 and LC-639 in August 2018 reported trace Aroclor-1262. Aroclor-1262 has not otherwise been detected in OU3 soils.

largely confined the area of the former boiler house and other buildings north of B Street (in Grid Group No. 14), and virtually no Aroclor 1260 detections exist.

At the time the OU3 BERA was prepared, there were no toxicological studies evaluating mammalian exposure to Aroclor-1268 and thus, a TRV based upon Aroclor-1254 was used. Appendix A of the OU3 BERA Report describes the results of several studies that estimated the relative potency of Aroclor-1268 compared with Aroclor-1254, at binding and activating the Ah receptor (“AhR”), which is the first step in a biological cascade resulting in toxicological responses that include dermal toxicity, immunotoxicity, carcinogenicity, and adverse effects on endocrine, reproductive, and developmental functions. These studies show that Aroclor-1268 is a considerably less potent activator of the AhR than is Aroclor-1254 (Villeneuve *et al.*, 2001; Burkhard and Lukasewycz, 2008).

Subsequent to the OU3 BERA, Honeywell funded an independent reproductive toxicity study of Aroclor-1268 in mink conducted by scientists at Michigan State University. In this study seven groups (negative control, positive control, and five Aroclor-1268 dose groups), each with ten female mink, were given Aroclor-1268 in their diet for two months prior to breeding, with exposure continuing through parturition and lactation. The researchers presented their data in a poster presentation at the 2012 Annual Meeting of the Society for Environmental Toxicology and Chemistry (“SETAC”) (Folland *et al.*, 2012). There was no evidence of reproductive failure or reduced reproductive capacity for any of the treatment groups. The authors did report several statistically significant responses in the highest exposure groups; the authors attributed these effects to changes in nutritional status related to the reduced palatability of the food administered to the higher treatment groups. Kit mortality in the 29 mg/kg group was due primarily to infanticide, suggesting that females consumed kits rather than eating unpalatable Aroclor 1268-spiked diet. The authors also reported a reduction in serum thyroxine in the 10, 17, and 29 mg/kg groups, but suggested that this response could also be related to nutritional status. Regardless of whether the effects observed in the highest Aroclor-1268 dose groups were related to toxicity or food avoidance, the corresponding dose levels were much higher than Aroclor-1254 doses administered in prior mink studies (Aulerich and Ringer, 1977) and associated with near-complete reproductive failure. The data presented from this study provide further support for the proposition that the mixture of PCB congeners in Aroclor-1268 are less potent at activating the Ah receptor as compared with Aroclor-1254, and therefore exhibit lower toxicity to mammals.

Collectively, the review of the relative potency of Aroclor-1268 provides that it is in the range of 1/3<sup>rd</sup> to 1/10<sup>th</sup> the ecological toxicity of Aroclor-1254, which formulated the basis for the BERA risk analysis to mammals and the PRG for total PCBs developed from the BERA.

#### 5.4.3 Land Use

Numerous manufacturing operations have occurred across the Site from 1919-1994. The Site and surrounding properties are zoned commercial/industrial. Sale and productive reuse of a portion of the Site have returned commercial development to the property, and further productive reuse of the remaining portion of the property from commercial/industrial operations is expected in the future.

#### 5.4.4 Discussion

EPA guidance describes the importance of identifying ecological management goals for a site (USEPA, 1999). The EPA guidance states:

“Superfund remedial actions generally should not be designed to protect organisms on an individual basis (the exception being designated protected status resources, such as listed or candidate threatened and endangered species or treaty-protected species that could be exposed to site releases), but to protect local populations and communities of biota.”

Under circumstances such as the LCP Superfund Site where areas (grids) of potential adverse exposure are limited, the home range of the wildlife guild is important as biota with large home ranges have lesser exposure to the site condition of concern. This supports the use of larger area groupings of the Site data (such as the grouping of four adjoining 1-acre grid cells performed herein) in the evaluation of ecological risk.

USEPA’s review of the 4-acre LAPA analysis focused on specific “hot spot” sample groupings exhibiting an inorganic mercury soil condition judged by EPA to potentially pose an unacceptable risk to infrequently exposed small mammal populations. The hot spots were further evaluated in this FS by calculating a volume-weighted mercury concentration yielding results of 6.1 mg/kg and 10.1 mg/kg, respectively, for the two hot spot areas and below the 14 mg/kg infrequent exposure PRG. Thus, a no-further-action determination for ecological protection is appropriate and justified for OU3 at the LCP Superfund Site.

# 6 PROTECTION OF GROUNDWATER RAO REVIEW

---

## 6.1 Protection of Groundwater RAO

The protection of groundwater RAO is to “assess and develop a protective remedy for vadose zone soils that exhibit a geographic continuity of constituents above modeled SSLs and which could adversely impact groundwater”. Central to the protection of groundwater RAO is a review of the SSL model’s predictive capability to determine if groundwater is adversely impacted at modeled SSL values, and furthermore, if currently impaired groundwater can be attributed directly to soil conditions in the vadose zone.

## 6.2 Chemical-Specific SSLs

### 6.2.1 Baseline Leaching CPOC and Assessment Process

The assessment process presented herein regarding the potential for chemicals in the upland soils to cause unacceptable risk by means of leaching via rainfall infiltration through vadose zone soil to the underlying groundwater, evaluates a set of four COPC identified by the US EPA (USEPA, 2018). The four COPC include: 1) naphthalene, 2) arsenic, 3) lead and 4) mercury. In this evaluation, the four COPCs are assessed in context of: 1) a modeled Site-specific SSL (“SSSL”) for protection of groundwater, 2) the variable Site vadose soil zone condition,<sup>14</sup> 3) empirical soil and groundwater data, and 4) with respect to the CSM to validate or refute the SSSL modeling method and identify the most plausible cause to the observed groundwater condition. The core elements of the assessment include the following:

- calculation of the SSSL for each COPC;
- refining of COPC soil data based on the Site’s inherently high-water table condition, therefore accurately presenting vadose zone soil that may undergo leaching via rainfall infiltration; and
- evaluation of COCs based on a comparative analysis of soil-groundwater contaminant co-location and the CSM to investigate causation of the existing groundwater condition, as it is recognized that leaching of chemicals from soil via rainfall infiltration represents one of several potential pathways that may contribute to the occurrence and distribution of chemicals in groundwater, therefore preventing a decision error with respect to the magnitude of concern and applicability of soil leaching.

---

<sup>14</sup> Prior SSL analysis universally applied a conservative 5-foot vadose zone condition to the Site. Actual vadose zone thickness, the layer for which leaching could potentially occur, is significantly less than 5 feet for the Site.

## 6.2.2 Site-specific SSLs

The EPA's SSL Technical Guidance states SSLs are not cleanup standards, nor do they define unacceptable levels of contamination in soil; rather, SSL are screening values used to identify and define areas, contaminants, and conditions that do not require further attention (EPA, 1996). SSLs are derived from standardized equations that combine exposure scenario assumptions with EPA toxicity data and indicate the constituent concentration in vadose zone or unsaturated soil that theoretically could result in a groundwater concentration above a risk-based criterion. The risk-based criterion is set to the federal drinking water standard (*i.e.*, the MCL) for arsenic, lead, and mercury, and the EPA Lifetime Health Advisory ("LHA") value (usually a precursor to the MCL) for naphthalene. The SSL is derived by a back-calculation from the groundwater criterion. SSSL are developed by determining a modifying factor to the default SSL accounting for the Site-specific dilution attenuation factor ("DAF") and soil fraction of organic carbon ("f<sub>oc</sub>"), as is presented in the following sections.

## 6.2.3 Derivation of the Site-Specific DAF

As infiltrating precipitation percolates through the vadose zone soil, it may solubilize chemical constituents that are present and carry them downward to the water table (*i.e.*, the "soil leachate"), where it mixes with the local groundwater condition and attenuates along the flow of groundwater to a defined groundwater receptor point. This reduction in concentration is expressed as a dilution attenuation factor ("DAF"), defined as the ratio of soil leachate concentration to receptor point concentration. From Section 2.5.5 of the SSL Technical Background Document, the Site-specific DAF is calculated from a mixing zone equation derived from a water-balance relationship:

$$(1) \quad DAF = 1 + \frac{Kid}{IL}$$

where K is the aquifer hydraulic conductivity (m/yr);

i is the hydraulic gradient (m/m or ft/ft);

d is the mixing zone depth (m);

I is the infiltration or recharge rate (m/y); and

L is the source length parallel to groundwater flow (m).

Mixing-zone depth is estimated from the following equation:

$$(2) \quad d = (2\alpha_v L)^{0.5} + d_a \left\{ 1 - \exp \left( \frac{-Li}{V_s n_e d_a} \right) \right\}$$

where  $\alpha_v$  is the vertical dispersivity (m/m);

$V_s$  is the horizontal seepage velocity (m/yr);

$n_e$  is the aquifer effective porosity;

$L$  is the source length parallel to groundwater flow (m);

$i$  is the hydraulic gradient; and

$d_a$  is the aquifer thickness.

Following are the parameter inputs in the calculation of a Site-specific DAF:

- source length (parallel to groundwater flow);
- infiltration rate (recharge);
- surficial aquifer thickness;
- mixing zone hydraulic conductivity;
- vertical dispersivity;
- hydraulic gradient; and
- seepage velocity.

Source Length: Per the Draft Development and Screening of Remedial Action Alternatives report (EPS, 2013a), the length of the source parallel to groundwater flow is estimated at 142 ft (46.6 m).

Infiltration Rate (recharge): The infiltration rate estimated over OU3 was established in the OU2 RI Report (Geosyntec, 1997) at 8 in/yr (0.2187 m/yr).

Aquifer Thickness: The saturated thickness of the surficial aquifer (*i.e.*, the Satilla Formation) was determined as the average elevation of the base of the Satilla Formation subtracted from a long-term, Site-wide average water table elevation. The base of the Satilla Formation is situated at approximately -32.1 ft National Geodetic Vertical Datum (“NGVD”) and the long-term, Site-wide water table elevation was approximated at 7.5 ft NGVD (these values were determined from Figures 4.4-3 and 4.4-19, respectively, of the OU2 RI Report); thus, the saturated thickness of the Satilla Formation is approximately 39.6 ft (12.07 m).

Hydraulic Conductivity of the Mixing Zone: The hydraulic conductivity of the groundwater recharge mixing zone across OU3 was determined as the average hydraulic conductivity of Model Layers 10 (uppermost portion of the Satilla Formation) and 9 (middle portion of the Satilla Formation) of the groundwater flow model presented in Section 6 of the Groundwater OU2 RI Report weighted for the thickness of each layer. The hydraulic conductivity of Model Layer 10 was estimated at 7.05 ft/d (0.00248 cm/s) by applying a calibrated model conductivity of 3 ft/d and 30 ft/d to 85% and 15% of the layer, respectively. The thickness of Model Layer 10 was estimated at 16.5 ft, determined as the midpoint of the elevation range reported for the bottom of the layer subtracted from the long-term, Site-wide water table elevation. Similarly, the hydraulic conductivity of Model Layer 9 was estimated at 21.01 ft/d (0.00741 cm/s) by applying a calibrated model conductivity of 3 ft/d and 30 ft/d to 33.3% and 66.7% of the layer, respectively. The thickness of Model Layer 9 was estimated at 10 ft, determined as the midpoint of the elevation range reported for the bottom of the layer subtracted from the midpoint of the elevation range for

Model Layer 10 (the overlying layer). Based on these values, the hydraulic conductivity of the groundwater recharge mixing zone across OU3 was estimated at 0.00434 cm/s (1,369 m/y).

Vertical Dispersivity: Dispersivity is an empirical factor that quantifies the spreading of chemical constituents away from the groundwater flow path due to the heterogeneity of the aquifer. A typical assumption is that vertical dispersivity is 1% of longitudinal dispersivity (*i.e.*, dispersivity along the principal direction of groundwater flow). Longitudinal dispersivity was estimated based on groundwater flow path length using mathematical relationships defined by Xu and Eckstein (1995). Because the receptor point is at the downgradient margin of the area identified as the source, the source length (46.6 m) was selected as the flow path length. Longitudinal dispersivity was calculated between 2.86 m (Xu and Eckstein, equation 14b) and 5.45 m (Xu and Eckstein, equation 12b) with an average longitudinal dispersivity of 4.155 m. Vertical dispersivity was estimated at 0.04155 m from the average longitudinal dispersivity.

Hydraulic Gradient: The hydraulic gradient was estimated from Figure 4.4-19 of the OU2 RI Report at 0.0039 ft/ft.

Seepage Velocity: Seepage velocity (*i.e.*, the apparent velocity of surface water infiltration) is calculated as the product of the aquifer hydraulic conductivity and the hydraulic gradient divided by the effective porosity,  $\frac{K I}{n_e}$ . Substituting this expression for  $V_s$  in Equation (2) reduces the term

$$\exp \left[ \frac{-L I}{V_s n_e d_a} \right] \text{ to } \exp \left[ \frac{-L}{K d_a} \right].$$

Using the information presented above, the mixing zone depth was calculated as follows:

$$d = (2\alpha_v L)^{0.5} + d_a \left\{ 1 - \exp \left( \frac{-L I}{V_s n_e d_a} \right) \right\}$$

$$d = (2\alpha_v L)^{0.5} + d_a \left\{ 1 - \exp \left( \frac{-L}{K d_a} \right) \right\}$$

$$d = (2 \times 0.04155 \text{ m} \times 46.6 \text{ m})^{0.5} + 12.07 \text{ m} \times \left\{ 1 - \exp \left( \frac{-46.6 \text{ m}}{1369 \text{ m/yr} \times 12.07 \text{ m}} \right) \right\}$$

$$d = 2.00 \text{ m}$$

Based on a mixing zone depth of 2.00 m, the Site-specific DAF was calculated at 2.04:

$$DAF = 1 + \frac{K i d}{I L}$$

$$DAF = 1 + \frac{1369 \text{ m/yr} \times 0.0039 \text{ m/m} \times 2.00 \text{ m}}{0.2187 \text{ m/yr} \times 46.6 \text{ m}} = 2.04$$

## 6.2.4 Site-Specific Fraction of Organic Carbon

The fraction of organic carbon is the portion of the organic matter that is available to adsorb organic constituents. Higher soil organic carbon content corresponds with greater potential for organic constituents to be adsorbed to soil and less potential for those constituents to leach to groundwater. Table 4-1 of the OU3 RI Report (EPS, 2012) presents organic carbon data for samples collected from 18 locations outside areas of prior excavation. The  $f_{oc}$  data shows a pattern of generally low values for deeper surficial soils with a median of 0.0085 for samples collected below 1 feet below ground surface (“ft bgs”). Similarly, the Draft OU3 FS Tech Memo (EPS, 2013a) presented a Site-specific  $f_{oc}$  for vadose zone soils of 0.0083; this value was used in the calculation of SSSLs.

## 6.2.5 Summary of Calculated SSSLs

Calculated SSSLs for the 4 COPCs – arsenic, lead, mercury, and naphthalene – are provided below with applicable Site-specific adjustment criteria. For each COPC, the SSSL was calculated as the product of the MCL-based protection of groundwater SSL (*i.e.*, arsenic, lead, and mercury) or the calculated SSL based on the LHA where an MCL is not available (*i.e.*, naphthalene), the Site-specific DAF (2.04), and the ratio of the Site-specific and default  $f_{oc}$  (0.0083/0.002) (equivalent to the SSL multiplied by 8.4). For the three metal COPC, the  $f_{oc}$  adjustment is not applied. The SSSL for metals was determined as the default SSL as provided in the EPA Regional Screening Level table multiplied by the Site-specific DAF (2.04).

**Calculated SSSLs**

COPC	Groundwater Criteria and Basis (units in $\mu\text{g/L}$ )	$f_{oc}$	DAF	SSSL (mg/kg)
Arsenic	10 (MCL)	NA	2.04	0.59
Lead	15 (MCL)	NA	2.04	28.6
Mercury	2 (MCL)	NA	2.04	0.2
Naphthalene	100 (LHA)	0.0083	2.04	2.65

Note: Physical-chemical parameters for each COPC based on May 2018 Chemical-specific Parameters Support Table, US EPA Regional Screening Levels.

## 6.3 Vadose Zone Soil Data Selection

The USEPA reviewed historical depth-to-water measurements across the Site in establishing an “average” and “high” water table depth for each of the four Quadrants as shown in the following table (USEPA, 2018):

Vadose Zone Soil Thickness (feet)			
Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
<i>Average Depth to Water</i>			
4.9	4.1	2.7	3.3
<i>High Water Table</i>			
1.9	1.7	0.8	1.7

Soil testing results within the vadose zone soil layer is applied to subsequent analyses to assess COPC leaching potential. The overall OU3 data set was queried within GIS to segregate samples taken above the high-water table mark to those taken below the water table, for each quadrant. Specifically, this was accomplished by the following data query:  $D1 \leq High\text{-}Water\ Table$  and  $D2 < High\text{-}Water\ Table + 1$  foot. D1 represents the top of the sampled interval and D2 represents the bottom of the sampled interval.

## 6.4 SSL Modeling and Assessment in Context of the CSM

### 6.4.1 Perspectives on SSL Modeling

SSSL modeling is a simplified approach to a complex environmental system and therefore includes several inherent assumptions and limitations. These assumptions and limitations to the model are recognized within the modeling guidance and noted here to keep the process in perspective and potentially allude to the basis of some of the shortcomings of the model’s predictions. First, the SSL modeling approach assumes an infinite source of each contaminant, a violation of system mass balance as the mass of the contaminant in soil must decrease over time if leaching is in fact occurring. The model also assumes the infinite soil contaminant mass is all soluble and available to potential leaching action (*i.e.*, equally contacted by infiltrating precipitation). Both assumptions are overly conservative and do not apply to natural systems. Specifically, contaminant mass can be rendered insoluble through mineralization or sequestration within the soil matrix, and due to variable permeabilities infiltrating precipitation does not contact the bulk soil matrix but flows through preferential pathways of least flow resistance. Lastly, in the event infiltrating precipitation does come into contact with a soil-bound contaminant, the modeling approach assumes

equilibrium is achieved, a condition almost never attributed to natural systems and overpredicts the mass transfer of a soil-bound contaminant to groundwater.

The limitations of the model's predictive accuracy are realized in review of the three metal COCs – arsenic, lead, and mercury – for which the SSSL model predicts that virtually the entire Site exceeds the soil condition threshold such that the underlying groundwater should exceed the MCL condition. This is not the case. Moreover, the SSSL modeling predicts the entire regional area of Brunswick may exhibit a groundwater condition in excess of the MCL – a condition that does not exist. A comparison of the SSSL to the regional background<sup>15</sup> soil condition in the following table illustrates the disparity.

	<u>Arsenic (mg/kg)</u>	<u>Lead (mg/kg)</u>	<u>Mercury (mg/kg)</u>
Modeled SSSL	0.59	28.6	0.2
Regional Background	1.56	155.5	1.15

An iterative assessment of the soil condition was performed to examine if an empirically-derived threshold soil concentration above the SSSLs may better correlate to the groundwater condition beneath the soil sample area. The iterative assessment was explored for two of the four COPC: lead and mercury. Arsenic was not evaluated due to its intermittent detection across the Site and low frequency of detection above the modeled SSSL. Naphthalene was not evaluated, as only a few soil samples exceed the SSSL based on the LHA (Section 6.5.4).

Figure 6-1 evaluates the soil lead condition as a function of a 400 mg/kg threshold value and subsequent intervals, which identifies regions of spatial continuity of vadose zone soil lead above 800 mg/kg and 1,200 mg/kg in Quadrant 3 and at the south-central portion of Quadrant 4.

The elevated groundwater lead condition does not correlate with the areas of elevated soil lead, rather the occurrence of groundwater above the lead MCL occurs principally in regions of geochemically-altered groundwater (from various alkaline process materials in the chlor-alkali operations). Thus, other factors require assessment with respect to the causation of increased aqueous concentrations of metals beyond that of just vadose zone soil (further details follow in Section 6.4.2).

Figure 6-2 illustrates the mercury vadose zone soil condition with a threshold value of one order of magnitude above the modeled SSSL value of 0.2 mg/kg at 2 mg/kg. At this higher threshold value interest is drawn spatially to the region between the former cell building area and groundwater to the west; however, the correlation is not maintained for the soil conditions north of the cell building area where vadose zone soil mercury is also above the 2 mg/kg threshold. The groundwater monitoring wells north of the cell building area report mercury at less than the MCL. Therefore, again other factors require assessment to evaluate potential causation.

---

<sup>15</sup> Background soil data values as provided by US EPA Region 4 based on their statistical review of the 1996 *Brunswick Community Study* of metals concentrations in soil.

## 6.4.2 Alternative Causation of COPCs in Groundwater

### 6.4.2.1 Overview

As stated, it is recognized that leaching of chemicals from vadose zone soil via rainfall infiltration represents one potential pathway that may contribute to the occurrence and distribution of constituents in groundwater, and other plausible pathways exist. In this evaluation, two documented pathways of plausible causation of the groundwater condition are considered which are supported by Site-specific investigations and scientifically accepted principles: 1) the caustic brine pool and alkaline impoundments; and 2) petroleum hydrocarbon source areas. Each of these are discussed below.

### 6.4.2.2 Caustic Brine Pool (“CBP”) and Alkaline Impoundments

The term CBP was devised during the early Site investigation work to identify the source of an altered groundwater geochemical condition resulting from a comingled release of process liquids from the chlor-alkali operations (caustic and brine). The primary condition used to define the CBP is a pH in excess of 10.5 Standard Units, with other general indicators including elevated salinity, elevated metals due to enhanced solubility (mercury, arsenic, lead and chromium), and reduced oxidation-reduction potential (“ORP”). Primary impacts of the CBP on the solid phases of the surficial aquifer include pH-driven dissolution of quarts and feldspar minerals as well as solubilization of naturally occurring humic (organic) substances within the aquifer matrix, and lastly, reductive dissolution of metal hydroxides which act as a secondary source of trace metals (*e.g.*, arsenic).

Figure 6-3 illustrates the spatial profile of the CBP as defined by groundwater pH (operationally defined as pH>10.5), and a down-gradient region of geochemically-altered groundwater. The CBP originated in the cell building area and nearby caustic storage/loading area and extends west and southwest across much of the northern half of Quadrant 4. Other alkaline process slurries were contained on the Site during its operational period including brine mud impoundments in Quadrant 4 and bleach mud and lime softening mud impoundment areas in Quadrant 3 - these alkaline process materials resulted in a more localized, and lesser magnitude geochemical alteration in the surficial aquifer. The field pH and ORP for 2012 (prior to CO<sub>2</sub> in-situ pH neutralization treatment) are provided in Figure 6-4a and Figure 6-4b, respectively to illustrate the areas of geochemical alteration as it influences the dissolved metals condition.

### 6.4.2.3 Petroleum Hydrocarbon Source Areas

The Site was originally developed as a crude oil refinery around 1919, with operations spanning the majority of the property (Figure 6-5). Process areas were concentrated in the western portion of Quadrant 3, and in the northwestern portion of Quadrant 4 (subsequent location of the chlor-alkali cell buildings). The primary areas of refinery process waste disposal occurred in portions of a former Brunswick-Altamaha Canal traversing the western margin of the uplands. Two tank batteries – one in Quadrant 3 (Bunker C Oil Tank Battery) and one in Quadrant 4 (Old South Tank Farm) – constitute additional petroleum hydrocarbon sources. These areas represent a practicable

historical pathway for the occurrence of naphthalene in groundwater based on conditions reviewed for the saturated zone as opposed to vadose zone soil. Further analysis follows in the next section of this report.

## 6.5 Soil-Groundwater Comparative Analysis of Soil-to-Groundwater SSSL PRGs

### 6.5.1 Arsenic

The arsenic SSSL is 0.59 mg/kg, thus soil exhibiting an arsenic concentration above this threshold is predicted by the SSSL model to result in a groundwater condition above the arsenic MCL of 10 µg/L, a prediction that is evaluated based on Site soil and groundwater data. Figure 6-6a illustrates the distribution and occurrence of soil arsenic with a finding that arsenic soil concentrations above the SSSL are detected intermittently Sitewide. In general, however, soil arsenic concentrations are detected more frequently below the SSSL with the exception of a limited area near the causeway road at the marsh-upland border.

The corresponding groundwater condition for arsenic is superimposed upon the soil arsenic data in Figure 6-6b, which illustrates arsenic in groundwater above the MCL occurs in profile with the established distribution of the geochemically-altered groundwater. Groundwater exceedance of the arsenic MCL does not spatially correlate with locations where the soil arsenic is above the SSSL (*i.e.*, Quadrant 1 or Q3 near the causeway road). The occurrence of arsenic in the profile of the CBP footprint is attributed to the geochemical mobilization of native arsenic in the regional background soil condition. First, arsenic bound in the metal hydroxides of the aquifer are released under the reducing conditions (*i.e.*, reductive dissolution) imparted by the very negative ORP of the CBP (*e.g.*, -200 to -400 mV). Secondly, arsenic mobility is greatly enhanced under caustic conditions as the arsenic oxyanion is less amendable to adsorption to the aquifer solids. The occurrence of arsenic above the MCL at the northwestern extent of OU3 also adheres to this geochemical mobilization model as groundwater near the MW-111 and MW-301 well pairs exhibit a residual pH and ORP condition associated with a former alkaline waste impoundment located in this immediate area. Thus, the most plausible cause of the groundwater arsenic condition is the geochemical modification of the surficial aquifer from alkaline process liquids released in the past, and not a result of soil-to-groundwater leaching of the thin vadose zone soil of OU3. This evaluation of empirical data and recognition of an alternate and defensible pathway (*i.e.*, subaqueous geochemical mobilization) for the occurrence of arsenic in groundwater supports the conclusion that arsenic be removed as a soil-to-groundwater leaching constituent.

### 6.5.2 Lead

The lead SSSL predicts a soil lead concentration of 28.6 mg/kg may cause a groundwater condition above the MCL of 15 µg/L. Figure 6-7a illustrates the distribution and occurrence of vadose zone soil lead with respect to the SSSL model, which finds Sitewide exceedance of the lead SSSL with soil lead concentrations frequently reported at one to two orders of magnitude above the SSSL. Therefore, if the SSSL model is valid for Site conditions, the Sitewide groundwater should exhibit

lead above the MCL, and in fact should be significantly greater than the MCL across the Site. However, this is not the case.

The corresponding groundwater condition for lead is superimposed upon the soil lead data in Figure 6-7b, and consistent with the occurrence of arsenic in groundwater, the groundwater lead distribution occurs in profile with the localized areas of altered groundwater geochemistry rather than uniformly across the Site as predicted by the SSSL. The south-central portion of Quadrant 3, which is unaffected by geochemical alteration and provides an ideal area to evaluate the SSSL model prediction, exhibits a lead condition in soil that is uniformly above the lead SSSL and its concentration represents the highest general vadose zone soil lead condition on the Site. Looking at the groundwater lead condition in this area, the soil lead is not leaching to the underlying groundwater. Below is an illustration of the soil lead condition relative to shallow groundwater (at the water table) from geoprobe sampling during the early phase of the OU2 RI, showing 10 of 11 geoprobe locations with a non-detect groundwater lead condition (1 geoprobe location reported an anomalous high result likely owing to sample turbidity, and issue common to geoprobe sampling).

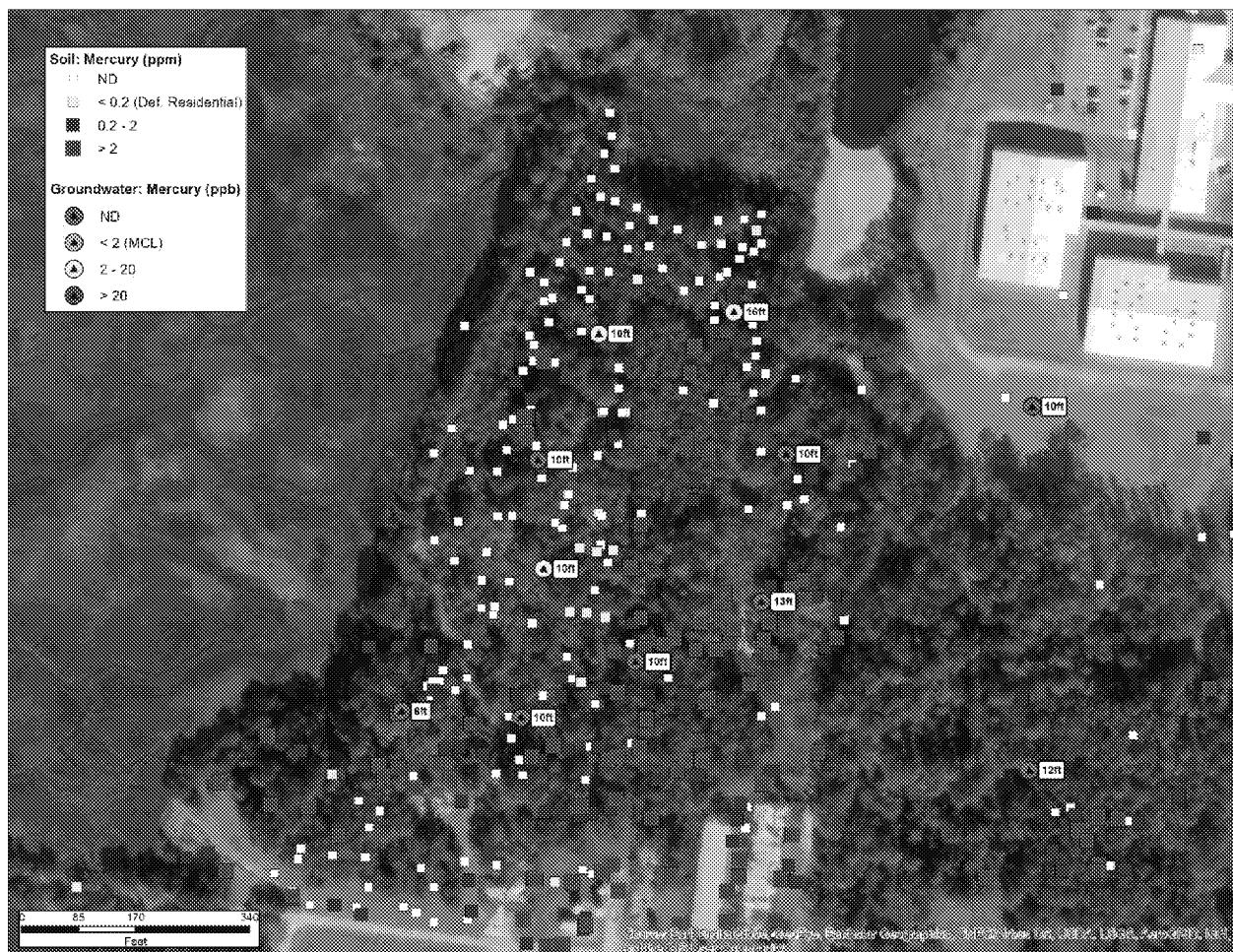


This evaluation of empirical data and recognition of an alternate and defensible pathway (*i.e.*, subaqueous geochemical mobilization) for the occurrence of lead in groundwater supports the conclusion that lead be removed as a soil-to-groundwater leaching constituent.

### 6.5.3 Mercury

The mercury SSSL predicts a soil mercury concentration of 0.2 mg/kg results in a groundwater condition above the MCL of 2 µg/L, a prediction that is evaluated based on Site soil and groundwater data. Figure 6-8a illustrates the distribution and occurrence of soil mercury across the Site with a finding similar to that of soil lead, in that the mercury soil SSSL exceedances occur with a high frequency and soil mercury concentrations are reported at one to two orders of magnitude above the SSSL Sitewide. Therefore, the SSSL model predicts Sitewide occurrence of mercury in groundwater at concentrations in excess of the MCL of 2 µg/L. Again, this condition is not supported by the Site data.

The corresponding groundwater condition for mercury is provided in Figure 6-8b, and consistent with arsenic and lead, illustrates detection of mercury above the MCL occurs in profile with the CBP or groundwater with an exceptionally low ORP and high pH. Groundwater mercury concentrations above the MCL are not observed Sitewide as predicted by the SSSL model. Therefore, the paired soil-groundwater data does not support soil-to-groundwater vadose zone soil leaching as the principal driver of the observed mercury groundwater condition. The south-central portion of Quadrant 3 is unaffected by geochemical alteration and provides an ideal area to further evaluate the SSSL model prediction, for here the soil is uniformly above the mercury SSSL. Below is an illustration of the soil mercury condition relative to shallow groundwater (at the water table) from geoprobe sampling during the early phase of the OU2 RI, showing 8 of 11 geoprobe locations with a non-detect groundwater mercury condition and 3 with slight mercury detections, 2 of which are in proximity to a former alkaline source.



As is the case with arsenic and lead, this evaluation of empirical data and recognition of an alternate and defensible pathway (*i.e.*, geochemical mobilization) for the occurrence of mercury in groundwater supports the conclusion that mercury be removed as a soil-to-groundwater leaching constituent.

#### 6.5.4 Naphthalene

The SSSL model predicts a soil naphthalene concentration of 2.65 mg/kg results in a groundwater condition of 100 µg/L and is evaluated herein based on Site soil and groundwater data. The spatial distribution of naphthalene in soil above the SSSL is provided in Figure 6-9a and illustrates that vadose zone soil naphthalene detections above the SSSL are largely absent in the vadose zone soil. In contrast, Figure 6-9b depicts soil naphthalene detections below the water table, which illustrates a pattern consistent with historical Site operations particularly in Quadrant 3 of the Site (*e.g.*, the former petroleum tank farm and sludge/waste impoundments aligned with the former Brunswick Altamaha Canal (Figure 6-3)). Note that this former Brunswick-Altamaha Canal was approximately 15 ft in depth and thus waste disposal within was below the water table, representing a subaqueous source of naphthalene to groundwater. The corresponding groundwater condition for naphthalene is provided in Figure 6-9c, with exceedance of the LHA occurring most notably within and adjacent to the Altamaha Canal and the southwest corner of the Bunker C Tank Farm.

The observation that the naphthalene condition is considerably higher and extensive below the water table (*i.e.*, the zone of fluctuation between the high and low water table) is evident in Site data with a high degree of vertical sample density. For example, sampling performed at the Old South Tank Farm (data below) illustrates a general absence of naphthalene detections in vadose zone soil, but widespread detection within the saturated zone, a condition consistent with a historical petroleum smear zone. Vertically profiled sample locations Quadrant 3 exhibit a similar profile although with a thinner vadose zone (< 2 feet) but clearly illustrating a naphthalene condition in the saturated zone, and a trace to a non-detect condition in the thin vadose zone (data below). Therefore, it is improbable that the naphthalene groundwater condition is driven by leaching of naphthalene by infiltrating water as it percolates through the vadose zone, but by the solubility and adsorption properties of naphthalene to the soil at or below the water table mark (*i.e.*, a residual petroleum products smear zone) which provides for a direct and practical pathway of naphthalene occurrence in groundwater.

**Old South Tank Farm Vertical Soil Naphthalene Profile**

Depth (ft-bgs)	Soil	OST-04/05/06	OST-07/08/09	OST-10/11/12	OST-13/14/15	OST-16/17/18	OST-19/20/21	OST-25/26/27	OST-31/32/33	OST-34/35/36	OST-37/38/39	OST-40/41/42	OST-43/44/45	OST-46/47/48
<1	Vadose	ND												
2 to 3		ND	ND	4.2	ND	2.4	ND							
5 to 6	Saturated	41.1	60.2	7.6	55.6	0.6	2.1	1.0	9.1	17.4	30.6	67.5	23.9	17.9

**Quadrant 3 Vertical Soil Naphthalene Profile**

Depth (ft-bgs)	Soil	GPT-31	GPT-32	HA-06	HA-07	HA-09	HA-15	HA-16	TT9C	TT9N	TT9S
0-2	Vadose*	0.042	0.85	ND	ND	ND	ND	ND	NS	NS	NS
2-4		0.084	28	3.26	0.93	34.8	1.08	0.652	ND	ND	ND
4-6	Saturated	NS	NS	18.3	7.3	31.4	24.7	2.53	28.7	4.26	0.528

\*The high-water table mark in the northwest is generally less than 2 ft-bgs.

ND: Non-detect

NS: Not sampled

## 6.6 Protection of Groundwater Summary

The protection of groundwater RAO assessment began with the four COPCs provided by the USEPA (USEPA, 2018). Evaluation of the modeled SSSLS for each COPC with respect to the vadose zone soil, a comparative analysis of soil-groundwater contaminant co-location, and lastly, established sources of COPC in groundwater other than soil-to-groundwater leaching based on the CSM, find soil-to-groundwater leaching to be an improbable source or even a principal cause of Site groundwater impairment. The groundwater condition with respect to the three metal COPC – arsenic, lead, and mercury – exhibit a resolute spatial profile with geochemically altered groundwater from past Site process liquid releases (*i.e.*, CBP and alkaline waste). The groundwater condition with respect to naphthalene, based on the EPA LHA, finds few detections



of soil above the SSSL, and where naphthalene is present in groundwater the condition is spatially consistent with past petroleum process areas or equated to a subaqueous naphthalene source. Therefore, we conclude that the vadose zone condition of the four COPC is not the principal cause of the underlying groundwater condition.

# 7 IDENTIFICATION AND EVALUATION OF RESPONSE ACTIONS

---

## 7.1 Overview

According to the document entitled “Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA” (USEPA, 1988), remedial response actions describe those actions that will satisfy the Site RAOs and comply with Applicable or Relevant and Appropriate Requirements (“ARARs”). Based on the evaluation of the RAOs presented in Sections 4, 5, and 6 of this FS and interactions with the agencies regarding the 2013 and 2018 Draft FS Tech Memos, the only action needed to ensure RAOs are met is to control land use to preclude any potential of future residential use of the Site. ARARs are limited for this simple action (identified in Section 7.4.2.2); no chemical- nor location-specific ARARs were identified for OU3. Accordingly, the following remedial action alternatives (“RAAs”) are evaluated herein for OU3:

- No Further Action; and
- No Further Action with institutional controls.

## 7.2 Description of RAAs

### 7.2.1 Remedial Action Alternative 1 (RAA1): No Further Action

A no-action alternative is required for consideration in accordance with the NCP. The No Further Action alternative provides a baseline for comparing other alternatives. Selection of the no-action RAA requires past removal actions which have achieved Site RAOs with respect human health, ecological risk, and protection of groundwater.

### 7.2.2 Remedial Action Alternative 2 (RAA 2): No Further Action with Institutional Controls

Institutional controls are non-engineered instruments that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy. For the LCP site, institutional controls would set activity and use limitations restricting further use of the Site to industrial purposes (no residential use), prohibiting the use of drinking water supply wells on the Site, and requiring an assessment for potential vapor intrusion risks prior to construction and/or the use of building controls (*e.g.*, sub-slab depressurization system) to address potential vapor intrusion risks where volatile organic chemicals are present in underlying groundwater. The activity and use limitations would be recorded in a uniform environmental covenant (“UEC”).

## 7.3 Evaluation Criteria for Remedial Action Alternatives

The NCP and the "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA, 1988) provide nine evaluation criteria to address the CERCLA statutory requirements considerations:

- overall protection of human health and the environment;
- compliance with ARARs;
- long-term effectiveness and permanence;
- reduction of toxicity, mobility, or volume;
- short-term effectiveness;
- technical implementability;
- cost;
- state acceptance; and
- community acceptance.

The first two criteria, overall protection of human health and the environment and compliance with ARARs, are threshold criteria (*i.e.*, must be met for an alternative to be considered a remedy for a site). The remaining five criteria are considered balancing criteria and are used for a cost-benefit analysis of RAAs meeting the threshold criteria. State and community acceptance are considered modifying criteria and are used to identify the preferred alternative after the public comment period.

The RAAs developed for OU3 soils are described in this section by assessment of 6 factors: overall protection of human health and the environment, compliance with ARARs, technical implementability, short-term effectiveness, long-term effectiveness, and relative cost. These factors are further described below.

- Overall Protection of Human Health and the Environment: This criterion provides an overall assessment of whether each alternative would adequately protect human health and the environment and how site risks would be eliminated, reduced, or controlled through treatment, engineering, or institutional controls.
- Compliance with ARARs: This criterion assesses whether alternatives meet all federal and state chemical-, location-, and action-specific ARARs for the Site. No chemical- and location-specific ARARs were identified for OU3; thus, assessment is limited to compliance with action-specific ARARs.
- Technical Implementability: This assessment evaluates the technical and administrative feasibility of alternatives and the availability of required inputs and services.
- Short-Term Effectiveness: The assessment for this criterion examines the effectiveness of alternatives in protecting human health and the environment during the construction and implementation of a remedy until the remedial action objectives have been met. This includes an estimate of time until RAOs are achieved.

- Long-Term Effectiveness and Permanence: The assessment of alternatives for this criterion evaluates the long-term effectiveness of alternatives in maintaining protection of human health and the environment after response objectives have been met.
- Cost: This assessment evaluates the capital and operation and maintenance (“O&M”) costs of each alternative.

## 7.4 Evaluation of Remedial Action Alternatives

### 7.4.1 Remedial Action Alternative 1 (RAA1): No Further Action

#### 7.4.1.1 Overall Protection of Human Health and the Environment

Residential land use exposure as presented in the HHBRA results in a HI ranging from 4-15 for various Quadrants and an ELCR as high as 10-4 for Quadrant 4; thus, the current condition represents an unacceptable risk to hypothetical future residents. Achievement of this RAO relies on a non-residential land use restriction.

#### 7.4.1.2 Compliance with Action-Specific ARARs

No actions are contemplated under RAA1.

#### 7.4.1.3 Technical Implementability

There are no actions to implement.

#### 7.4.1.4 Short-Term Effectiveness

Because there are no actions to implement, there will be no additional short-term risks posed to the community or the environment as a result of this alternative being implemented.

#### 7.4.1.5 Long-Term Effectiveness and Performance

Past removal actions have achieved Site RAOs with respect to human health under a non-residential use, ecological risk, and protection of groundwater. The human health RAO is not achieved for a hypothetical residential land-use scenario.

#### 7.4.1.6 Cost

There is no cost for RAA1.

### 7.4.2 Remedial Action Alternative 2 (RAA2): No Further Action with Institutional Controls

#### 7.4.2.1 Overall Protection of Human Health and the Environment

Past removal actions have achieved Site RAOs with respect to ecological risk and protection of groundwater. Protectiveness of the hypothetical residential land-use scenario human health requires a non-residential land use restriction; this is accomplished through the institutional controls. With this action, RAA2 is deemed to be protective of human health and the environment.

#### 7.4.2.2 Compliance with Action-Specific ARARs

For the Action-Specific ARAR, we would need to draft and record a UEC that contains appropriate provisions regarding the enforceability, notification, recording, amendment, and termination of the UEC.

#### 7.4.2.3 Technical Implementability

This alternative would be simple to implement.

#### 7.4.2.4 Short-Term Effectiveness

There will not be additional short-term risks posed to the community or the environment as a result of this alternative being implemented.

#### 7.4.2.5 Long-Term Effectiveness and Performance

Past removal actions have achieved Site RAOs with respect to human health under a non-residential use limitation, ecological risk, and protection of groundwater. Thus, the long-term effectiveness and performance of RAA2 is deemed to be satisfactory.

#### 7.4.2.6 Cost

Cost associated with RAA2 are for developing, implementing, and reviewing the UEC. The estimated cost for developing and implementing the UEC is \$10,000. There are no annual O&M costs associated with this alternative. Periodic costs for reviewing and modifying (if necessary) the UEC are estimated at \$5,000 per review. Review would occur at a 5-year frequency in accordance with EPA's 5-year remedy review administrative process.

### 7.5 Discussion of Alternatives

Past removal actions have achieved Site RAOs with respect to ecological risk and protection of groundwater. Protectiveness of human health for hypothetical residential land-use scenario relies on a non-residential land use limitation; thus, a remedy that includes institutional controls (RAA2) would be necessary. RAA2 is simple to implement, does not pose short-term risk to the community or the environment, will be effective over the long-term, and is relatively inexpensive.

## 8 REFERENCES

---

- Abramsky Z. Tracy C. R.. 1980. Relation Between Home Range Size and Regulation of Population Size in *Microtus Ochrogaster*. *Oikos* 34:347–355.
- Aliaga-Rossel E. Kays R. W. Fragoso J. M. V.. 2008. Home-Range Use by the Central American Agouti (*Dasyprocta Punctata*) on Barro Colorado Island, Panama. *Journal of Tropical Ecology* 24:367–374.
- Allard P, Fairbrother A, Hope BK, Hull RN, Johnson MS, Kapustka L, Mann G, McDonald B, Sample BE. 2010. Recommendations for the Development and Application of Wildlife Toxicity Reference Values. *Integr Environ Assess Manag* 6:28–37.
- Aulerich RJ and Ringer RK. 1977. Current Status of PCB Toxicity to Mink, and Effect on Their Reproduction. *Archives of Environmental Contamination and Toxicology*, 6: 279-292.
- ATSDR, 2018. Minimal Risk Levels (MRLs), Agency for Toxic Substances and Disease Registry (ATSDR), August 2018. [<https://www.atsdr.cdc.gov/mrls/mrllist.asp>]. Intermediate and Chronic Oral MRLs for Polychlorinated Biphenyl (PCBs) (Aroclor 1254), final November 2000.
- Borowski Z. 2003. Habitat Selection and Home Range Size of Field Voles *Microtus Agrestis* in Slowinski National Park, Poland. *Acta Theriologica* 48:325–333.
- Burkhard L and Lukasewicz M. 2008. Toxicity Equivalency Values for Polychlorinated Biphenyl Mixtures. *Environmental Toxicology and Chemistry*, 27(3): 529-534.
- CDR Environmental Specialists, Inc. and Environmental Planning Specialists, Inc. (EPS, Inc.). 2010. Baseline Ecological Risk Assessment for the Upland at the LCP Chemicals Site. (August, 2010).
- Charters DW and Greenburg MS. 2004. A novel weight of evidence approach to derive a site specific cleanup goal. Poster presented at 25th Annual Meeting Annual Meeting of the Society of Environmental Toxicology and Chemistry North America, November 14-18.
- Environmental Planning Specialists, Inc. (EPS). 2010. Memorandum to US EPA Region 4 Regarding Transglobal Environmental Geochemistry (TEG) Documents, LCP Chemicals Site, Brunswick, Georgia. Memo dated February 11, 2010.
- EPS. 2012. Human Health Baseline Risk Assessment for Upland Soils (Operable Unit 3) - Final, LCP Chemicals Site, Brunswick, Georgia.
- EPS. 2013a. Remedial Investigation Report, Operable Unit 3 – Upland Soils, LCP Chemicals Site, Brunswick, Georgia.
- EPS. 2013b. Draft Development and Screening of Remedial Action Alternatives Operable Unit 3 – Upland Soils: LCP Chemicals National Priorities List Site, Brunswick, Glynn County, Georgia.

- EPS. 2018. Development and Screening of Remedial Action Alternatives Operable Unit 3 – Upland Soils: LCP Chemicals National Priorities List Site, Brunswick, Glynn County, Georgia.
- Fernandes, F. R., L. D. Cruz, E. G. Martins, AND S. F. Dos Reis. 2010. Growth and Home Range Size of the Gracile Mouse Opossum *Gracilinanus Microtarsus* (Marsupialia: Didelphidae) in Brazilian cerrado. *Journal of Tropical Ecology* 26:185–192.
- Folland W, Bursian S, and Zwiernik, M. 2012. Assessing the Toxic Potency of Aroclor 1268 to Piscivorous Marine Mammals Using Mink as a Mammalian Model. Poster presentation at the 33<sup>rd</sup> Annual Meeting of the Society of Environmental Toxicology and Chemistry North America, November 11-15.
- Georgia Department of Natural Resources, Environmental Protection Division. (GAEPD) 1990. RCRA Facility Assessment LCP Chemicals-Georgia, September 30.
- GeoSyntec Consultants. 1997. Remedial Investigation Report Groundwater Operable Unit. LCP Chemicals Brunswick, Georgia.
- Getz L. L. Oli M. K. Hofmann J. E. McGuire B. Ozgul A.. 2005. Factors Influencing Movement Distances of two Species of Sympatric Voles. *Journal of Mammalogy* 86:647–654.
- Getz L. L. McGuire B. 2008. Factors Influencing Movement Distances and Home Ranges of the Short-Tailed Shrew (*Blarina brevicauda*). *Northeastern Naturalist* 15:293–302.
- Hope, B.K. 2006. An Examination of Ecological Risk Assessment and Management Practices. *Environ. Int.* 32(8), 983-95.
- Hope BK. 2012. Exposure Gone “Wild”: A Call for Rational Exposure Scenarios. *Human and Ecological Risk Assessment*, 18(3): 485-487.
- Hubbs, A. H., and R. Boonstra. 1998. Effects of Food and Predators on the Home-Range Sizes of Arctic Ground Squirrels (*Spermophilus Parryii*). *Canadian Journal of Zoology—Revue Canadienne de Zoologie* 76:592–596.
- Jonsson, Pernilla, Tommi Hartikainen, Ess Koskela, and Tapios Mappeset. 2002. Determinants of Reproductive Success in Voles: Space Use in Relation to Food and Litter Size Manipulation. *Evolutionary Ecology*, Vol. 16, No. 5, pp. 455–467. *Canadienne DeZoologie* 76:592–596.
- Lira, P. K., F. A. D. Fernandez, H. S. A. Carolos, and P. D. Curzio. 2007. Use of a Fragmented Landscape by Three Species of Opossum in South-Eastern Brazil. *Journal of Tropical Ecology* 23:427–435.
- Mayfield, DB; Johnson, MS; Burris, JA; Fairbrother, A. 2014. Furthering the Derivation of Predictive Wildlife Toxicity Reference Values for Use in Soil Cleanup Decisions. *Integr. Environ. Assess. Manag.* 10(3):358-371.
- Oregon Department of Environmental Quality, Environmental Cleanup Program. 2017. Ecological Risk Assessment Technical Workgroup Recommendation Report.

- Sayre, Mark W., Baskett, Thomas S., Sadler, Kenneth C. 1980. *Radiotelemetry Studies of the Mourning Dove in Missouri*. Missouri Dept. of Conservation.
- Tannenbaum LV. 2005. A Critical Assessment of the Ecological Risk Assessment Process: A Review of Misapplied Concepts. *Integrated Environmental Assessment and Management*, 1(1): 66-72.
- U.S. Environmental Protection Agency (USEPA). 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA.
- USEPA, 1993. Exposure Factors Handbook 2003 Edition (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-93/187, December 1993.
- USEPA. 1996. Soil Screening Guidance: Technical Background Document, Office of Emergency and Remedial Response. Washington. Publication 9355.4-17A.
- USEPA, 1999. Issuance of Final Guidance: Ecological Risk Assessment and Risk Management Principles for Superfund Sites. OSWER Directive 9285.7-28P. October.
- USEPA. 2000. Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment Bulletins. EPA Region 4, originally published November 1995.
- USEPA. 2005. Guidance for Developing Ecological Soil Screening Levels. Washington (DC): USEPA. OSWER Directive 9285.7-55.
- USEPA. 2006. Personal Communication between Kevin Korporec and Shea Jones, USEPA, and Kirk Kessler and Mark Bowland, MWH, March 23.
- USEPA. 2018. Notice of Disapproval of April 2013 Draft Development and Screening of Remedial Action Alternatives Operable Unit 3 – Upland Soils: LCP Chemicals National Priorities List Site, Brunswick, Glynn County, GA. Dated July 31, 2018.
- Villeneuve DL, Khim JS, Kannan K, and Giesy JP. 2001. In Vitro Response of Fish and Mammalian Cells to Complex Mixtures of Polychlorinated Naphthalenes, Polychlorinated Biphenyls, and Polycyclic Aromatic Hydrocarbons. *Aquatic Toxicology*, 54(1-2): 125-141.
- Xu, M, and Y. Eckstein. 1995. Use of Weighted Least-Squares Method in Evaluation of the Relationship Between Dispersivity and Field Scale. *Ground Water*, Vol. 33, No. 6.



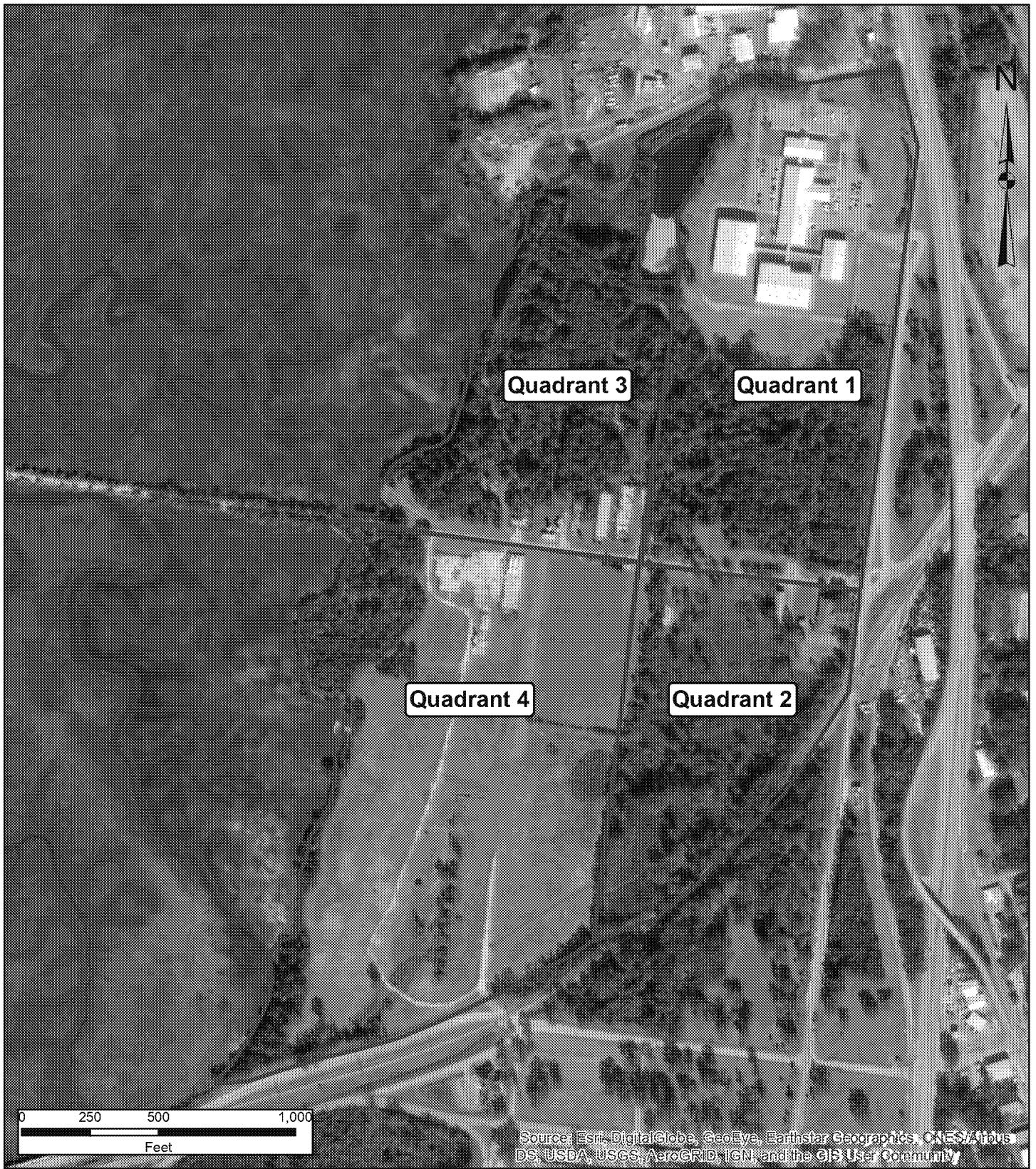
## FIGURES



 Upland (OU3) Site Boundary

**Site Location**

*LCP Chemicals Site  
Brunswick, GA*



### Human Health Risk Assessment Exposure Units (Quadrants)

*LCP Chemicals Site  
Brunswick, GA*

Figure No. 4-1a

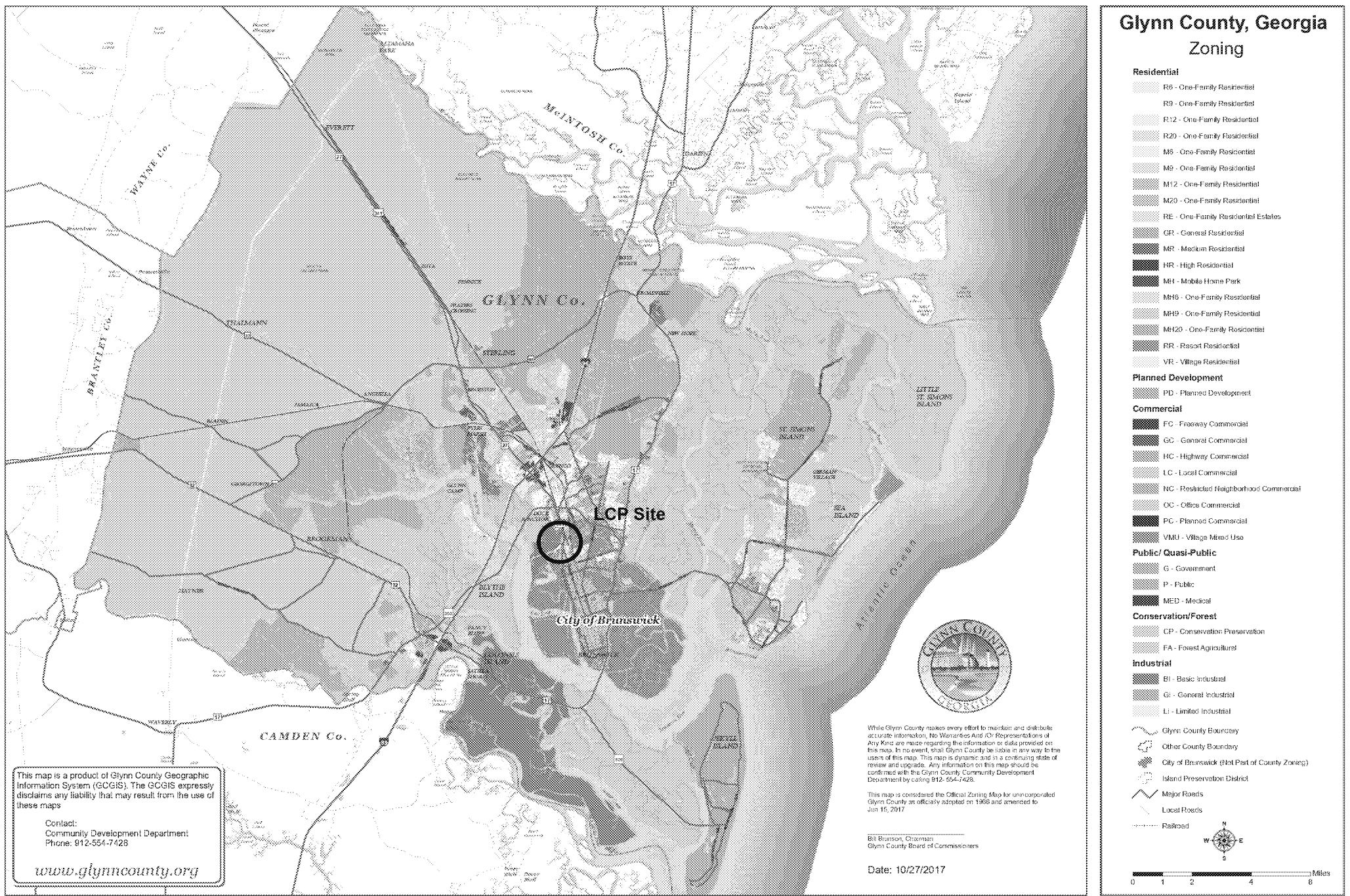
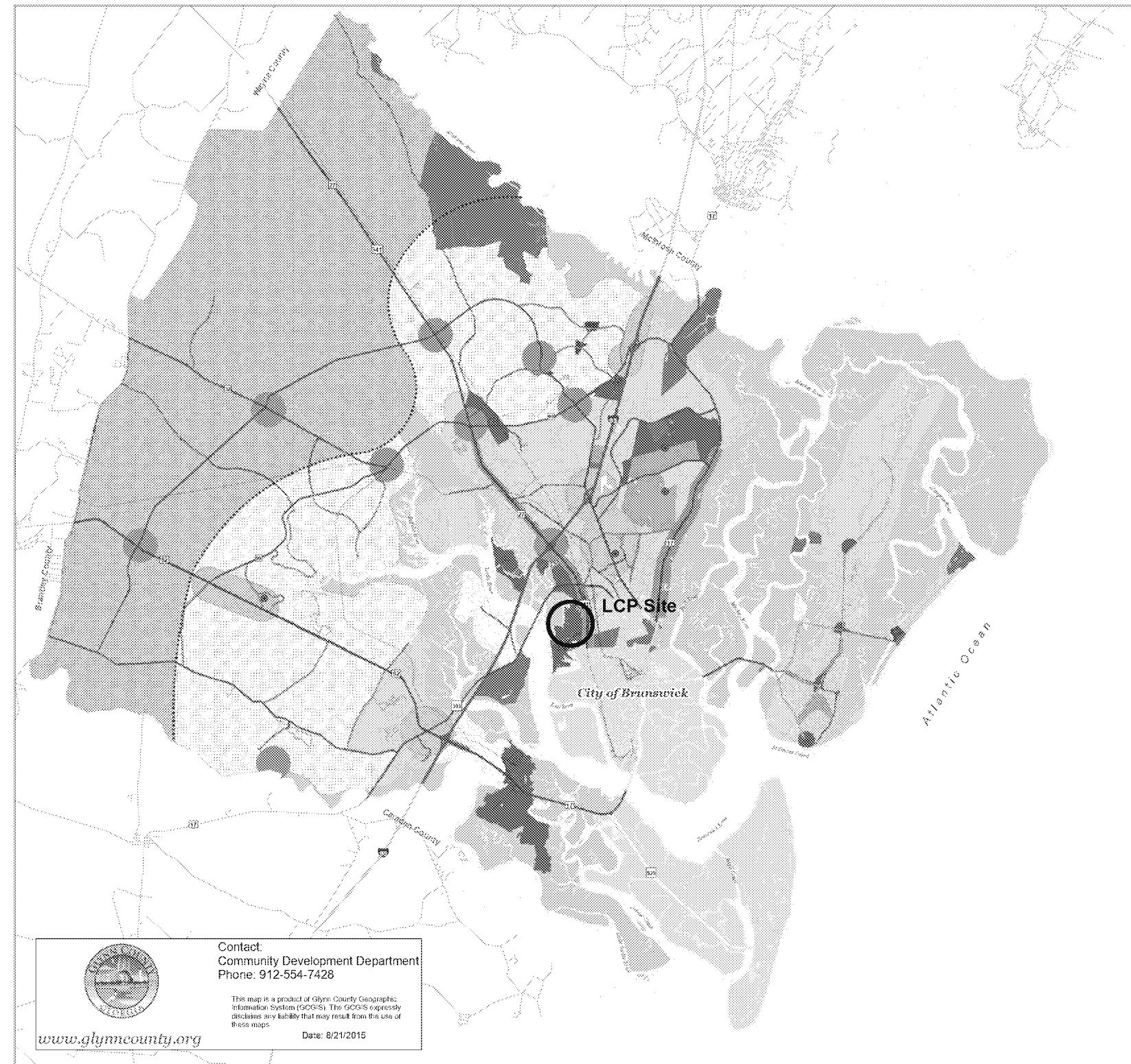


Figure No. 4-1b



## Glynn County, Georgia

### Future Land Use Map

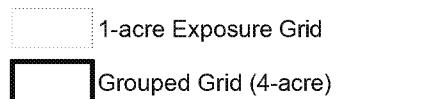
#### Legend

##### Future Land Use

- LDRI - Low Density Residential Island
- LDR - Low Density Residential
- MDR - Medium Density Residential
- HDR - High Density Residential
- AG - Agricultural
- CMU - Corridor Mixed-Use
- COM - Commercial
- CP - Conservation Preservation
- PRC - Parks/ Recreation
- PI - Public/ Institutional
- IND - Industrial
- JIA - Jekyll Island Authority
- Employment Center
- City of Brunswick
- Railroad
- GA Power
- Southern Natural Gas
- Collector
- Future Arterial
- Major Arterial
- Constricted Arterial
- Construction Plan
- Minor Arterial
- Interstate/ U.S. Highways
- Recommended Growth Limit
- Roads
- Regional Center
- 1/2 mile Village Center
- Island Village Center
- Rural Overlay
- Water



0 1.5 3 4.5 Miles



### Grid Layout for Spatial Analysis

*LCP Chemicals Site  
Brunswick, GA*



- Grouped Grids
- Soil Cover (clean)
- Soil Backfill (clean)
- Low Quality Habitat (Hardscape)

### Ecological Exposure Review Setup

*LCP Chemicals Site  
Brunswick, GA*





#### Total PCBs in Surface Soil

- ND
- < 2 ppm
- 2-6 ppm
- 6-50 ppm
- > 50 ppm

Grouped Grids

Soil Cover (clean)

Soil Backfill (clean)

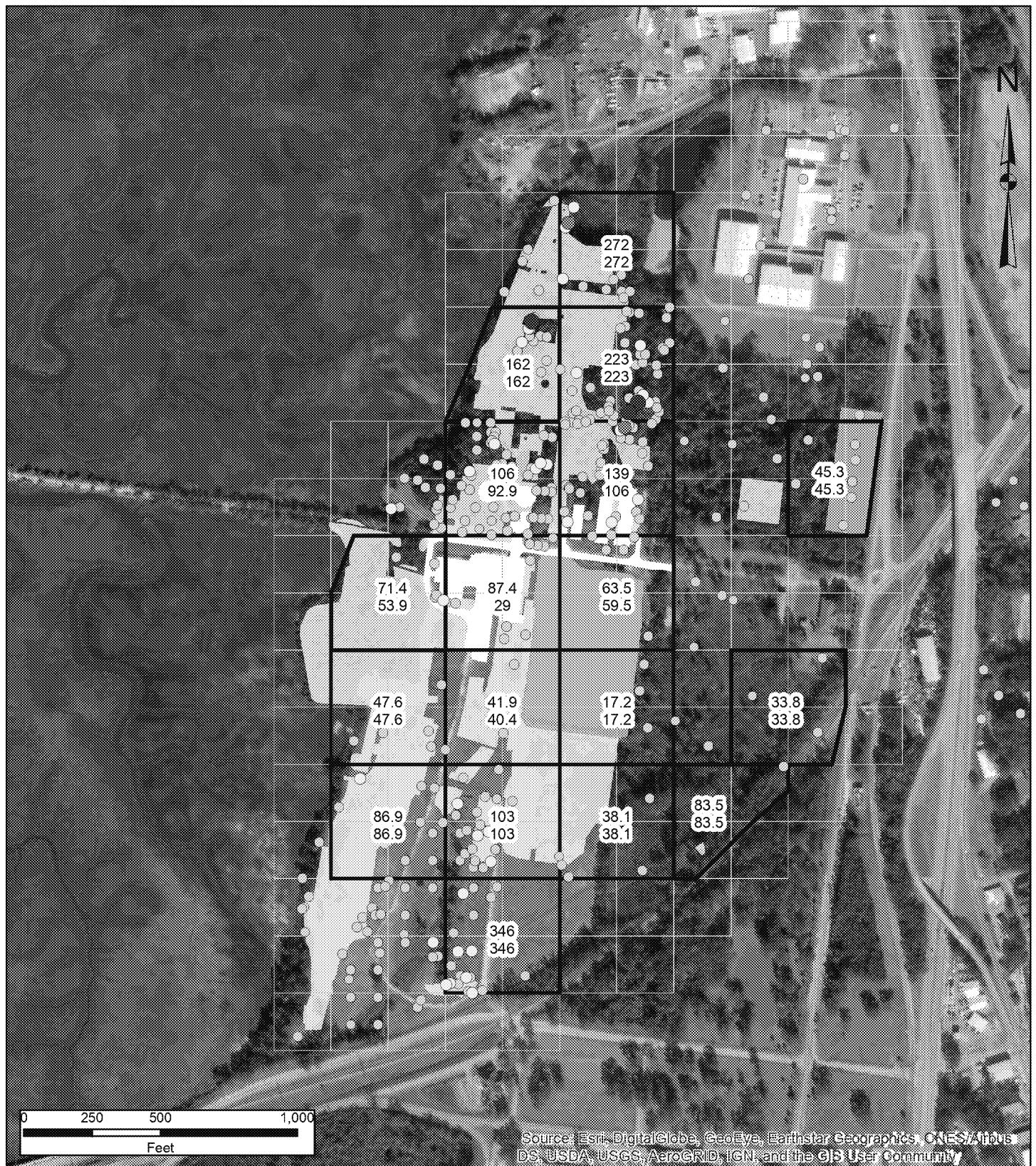
1.0	Weighted Avg. Adjusted for Backfill
1.0	Weighted Avg. Further Adjusted for Hardscape

Low Quality Habitat (Hardscape)

#### Ecological Exposure Review Evaluation- Total PCB

Note: Data shown were used  
in Scenarios 4 and 5, RI  
Report Appendix C

LCP Chemicals Site  
Brunswick, GA



#### Pb in Surface Soil

○ 400-1100 ppm      □ Grouped Grids

○ ND

● 1100-2400 ppm

■ Soil Cover (clean)

○ <400 ppm

● >2400 ppm

Soil Backfill (clean)

Low Quality Habitat (Hardscape)

1.0

Weighted Avg. Adjusted for Backfill

1.0

Weighted Avg. Further Adjusted for Hardscape

Note: No TEG Data

## Ecological Exposure Review Evaluation- Lead

*LCP Chemicals Site  
Brunswick, GA*

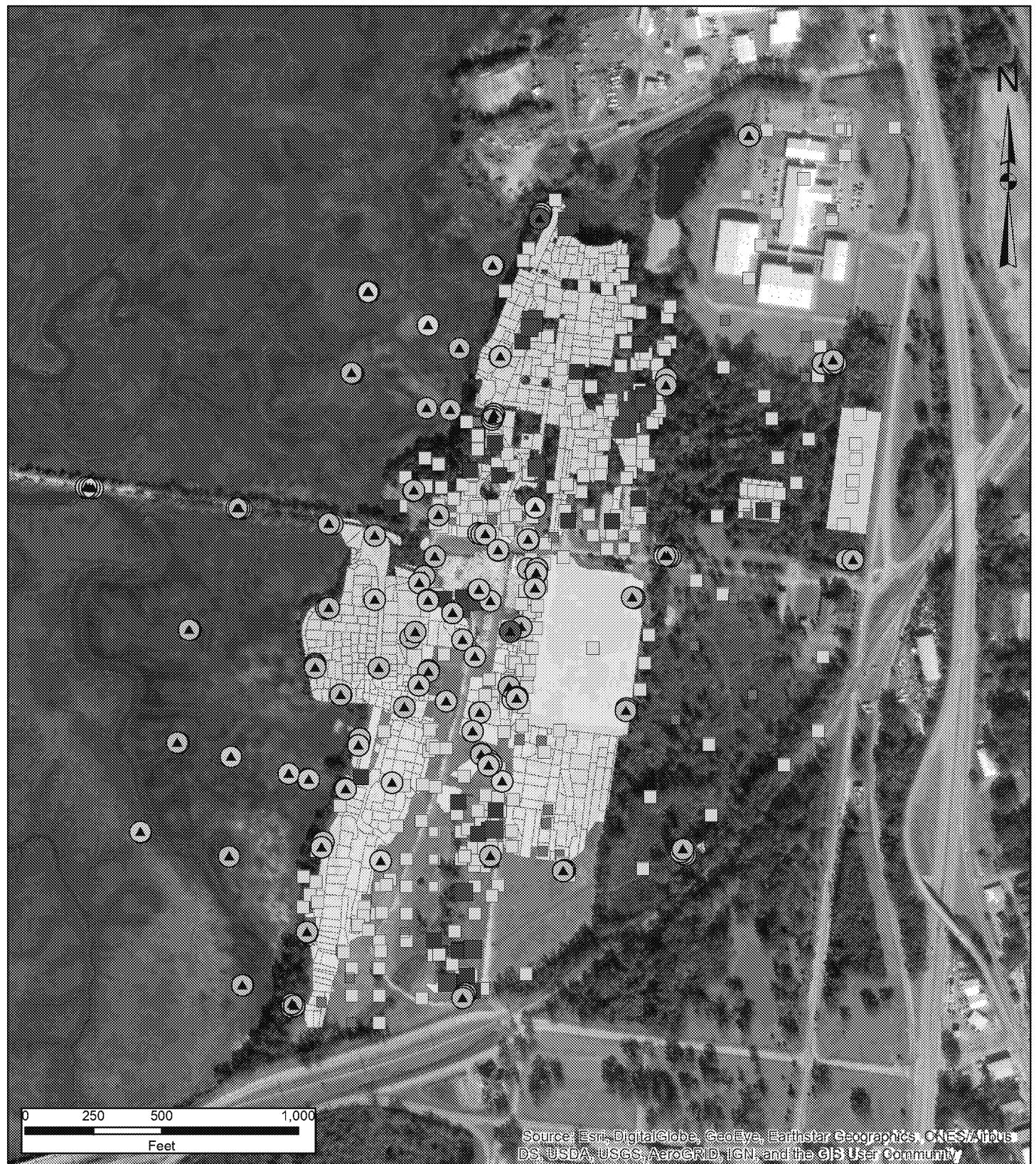


### Mercury Hot Spots Identified by USEPA

*LCP Chemicals Site  
Brunswick, GA*



**Panel View of Aroclor 1254, 1260, and 1268 in Surface Soil**



**Lead (mg/kg)**

- ND
- < 400
- 400 - 800
- 800 - 1,200
- > 1,200

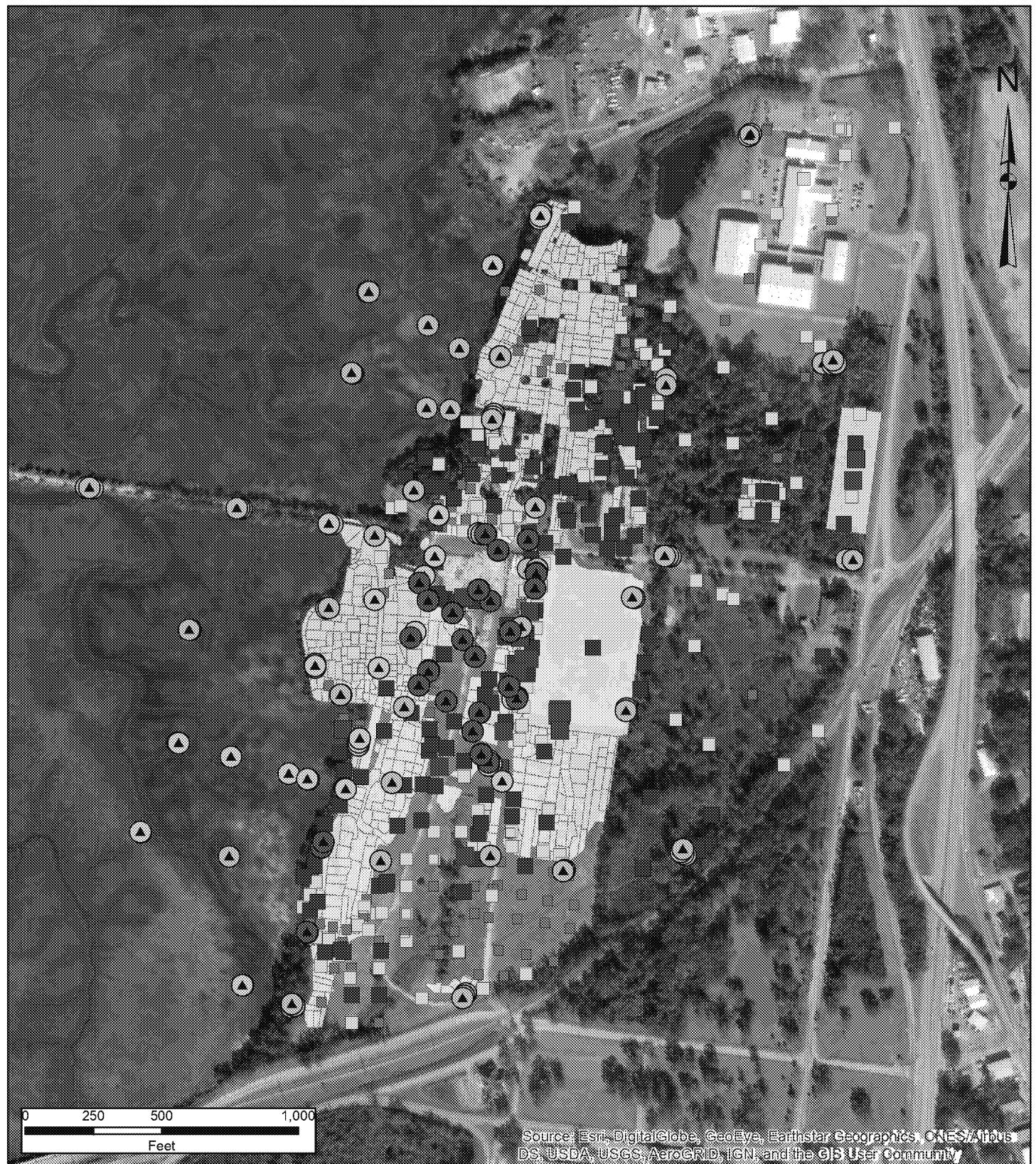
**2012 GW Lead ( $\mu\text{g/L}$ )**

- ND
- < 15 (MCL)
- 15 - 150
- > 150

Soil Removal Grids

## Iterative Review of Soil Lead

*LCP Chemicals Site  
Brunswick, GA*



**Mercury (mg/kg)**

- ND
- < 2
- 2 - 20
- 20 - 200
- > 200

**2012 GW Mercury ( $\mu\text{g/L}$ )**

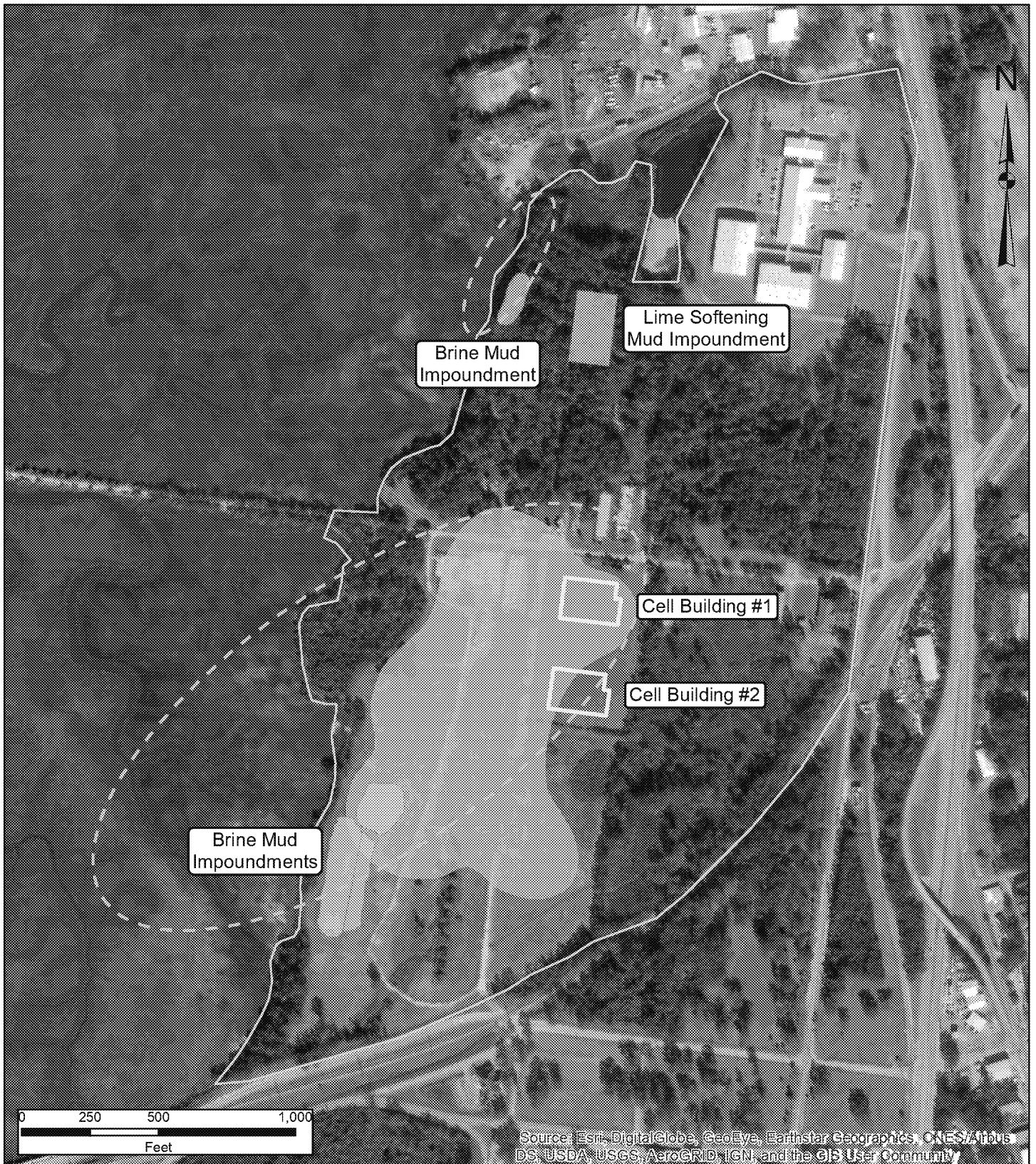
- ND
- < 2 (MCL)
- 2 - 20
- > 20

Soil Removal Grids

Soil Removal Grids

### Iterative Review of Soil Mercury

*LCP Chemicals Site  
Brunswick, GA*

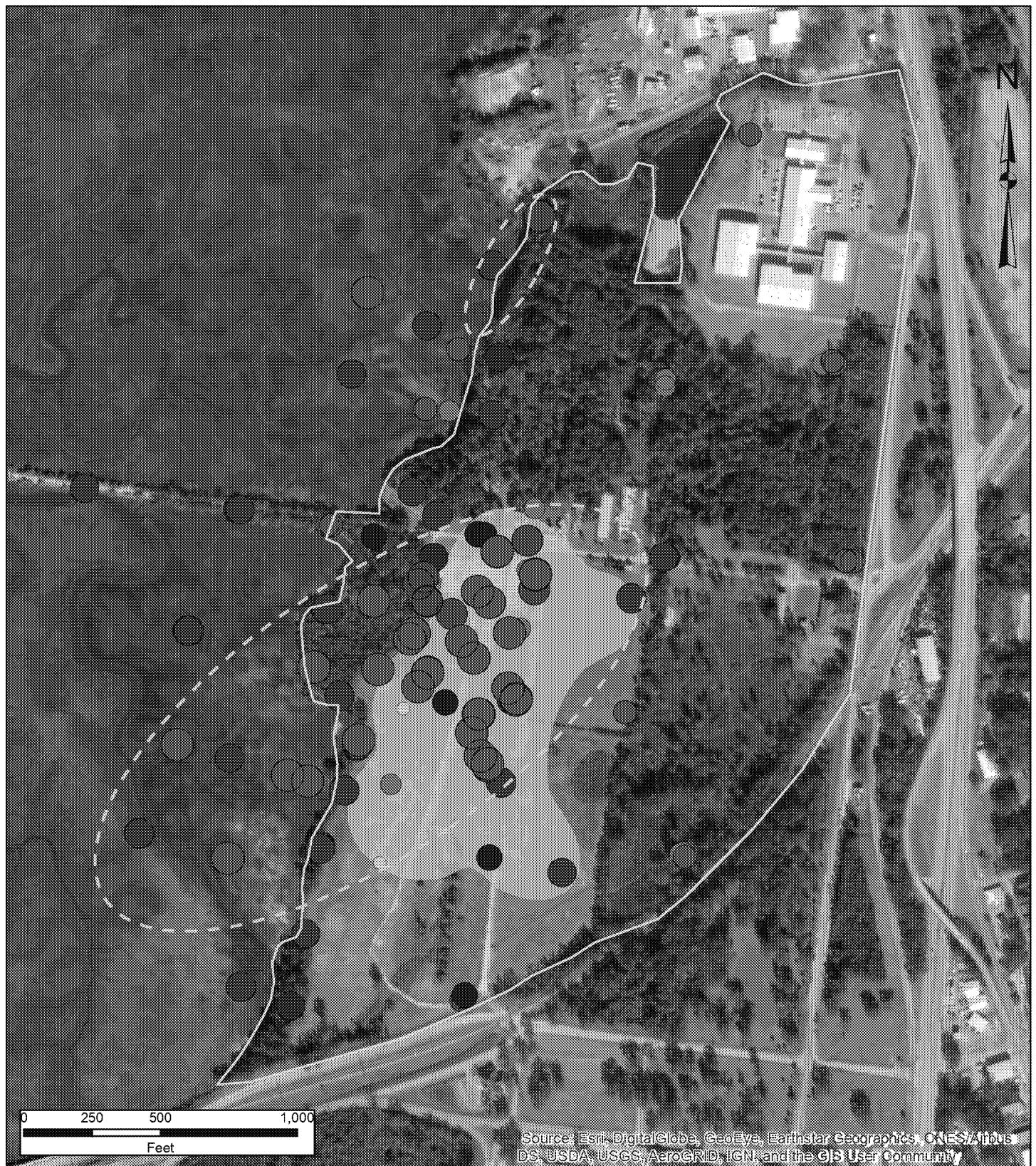


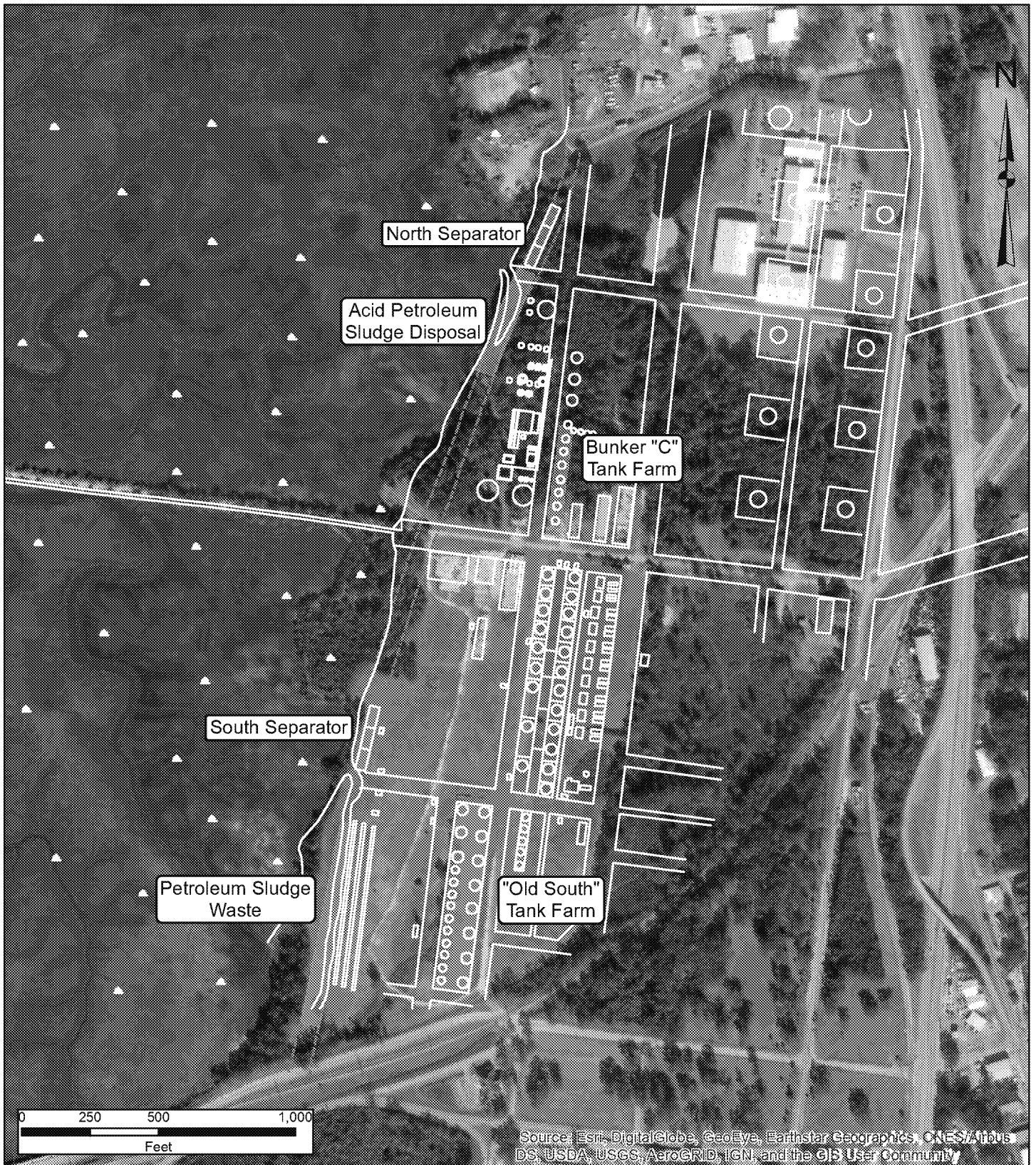
### CBP Profile and Alkaline Impoundments

*LCP Chemicals Site  
Brunswick, GA*

Dashed lines identify approximate groundwater regions influenced by the CBP or alkaline waste impoundments.









### Arsenic (mg/kg)

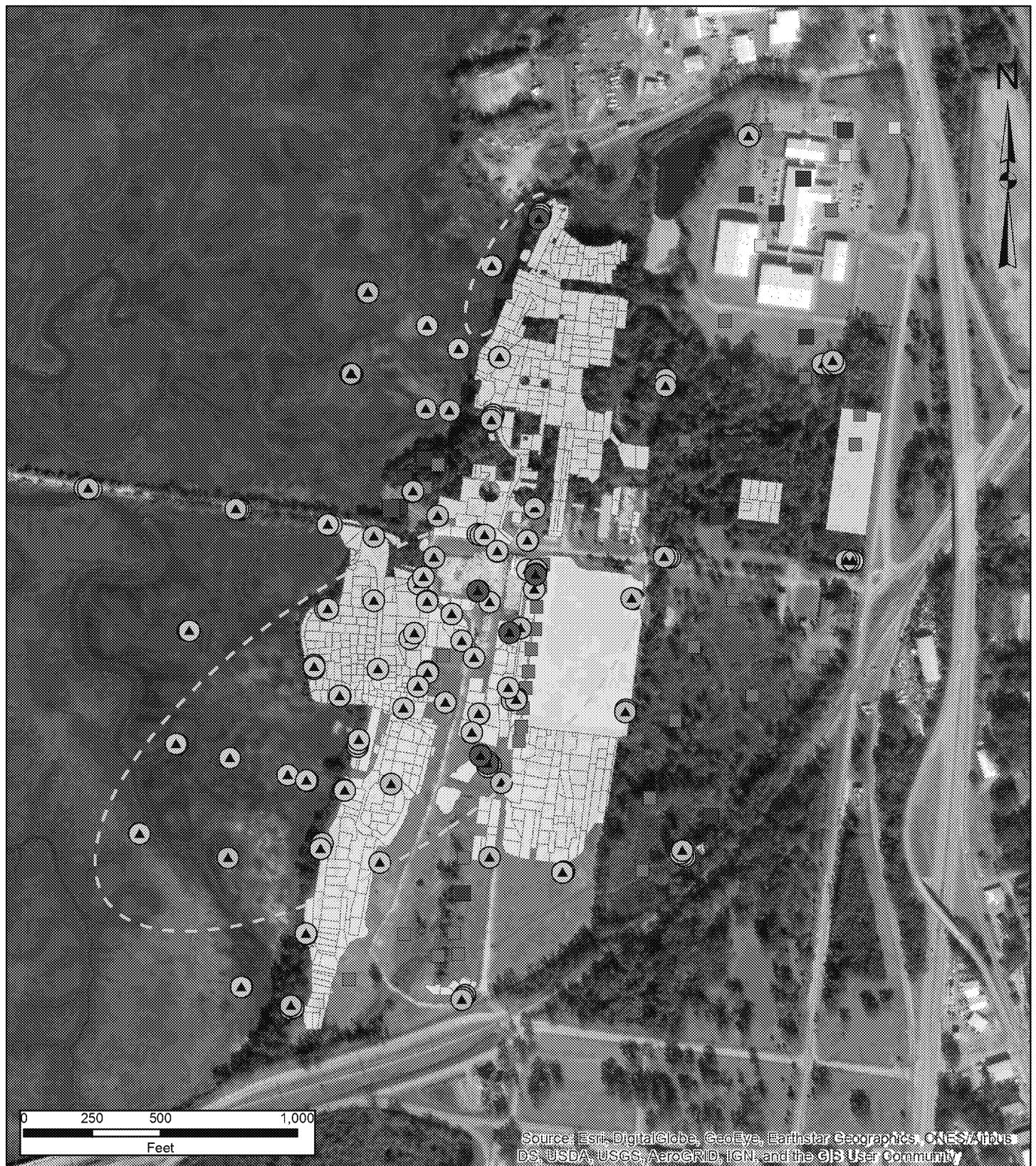
- ND
- < 0.59 (SSSL)
- 0.59 - 5.9
- 5.9 - 59
- > 59

Geochemically-Altered Groundwater

Soil Removal

### Comparison of Vadose Zone Soil Arsenic to SSSL

*LCP Chemicals Site  
Brunswick, GA*



**Arsenic (mg/kg)**

- ND
- < 0.59 (SSSL)
- 0.59 - 5.9
- 5.9 - 59
- > 59

**2012 GW Arsenic (µg/L)**

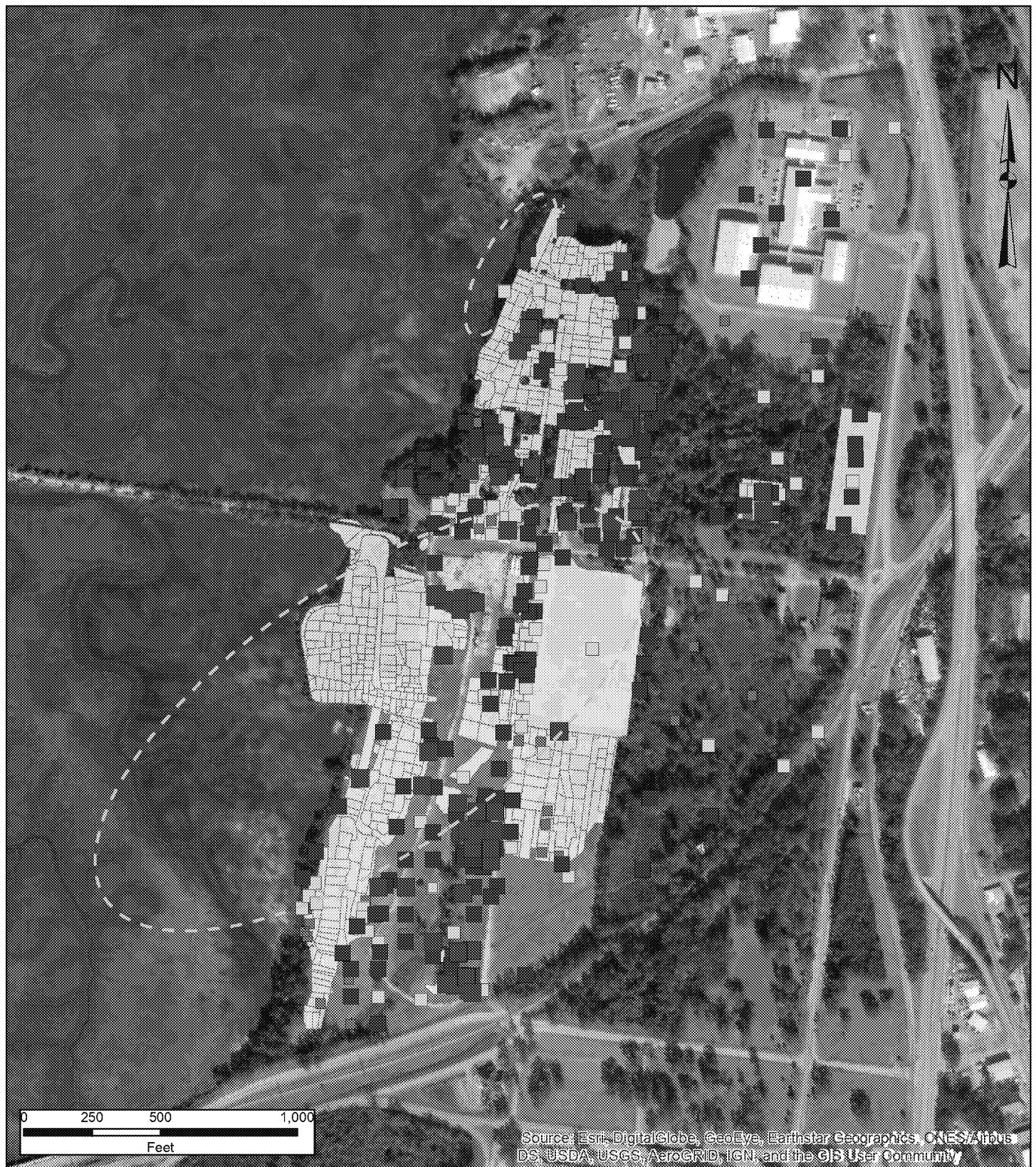
- ND
- < 10
- 10 - 100
- > 100

**Geochemically-Altered Groundwater**

- Soil Removal

## Comparative Review of Vadose Zone Arsenic & Groundwater

*LCP Chemicals Site  
Brunswick, GA*



**Lead (mg/kg)**

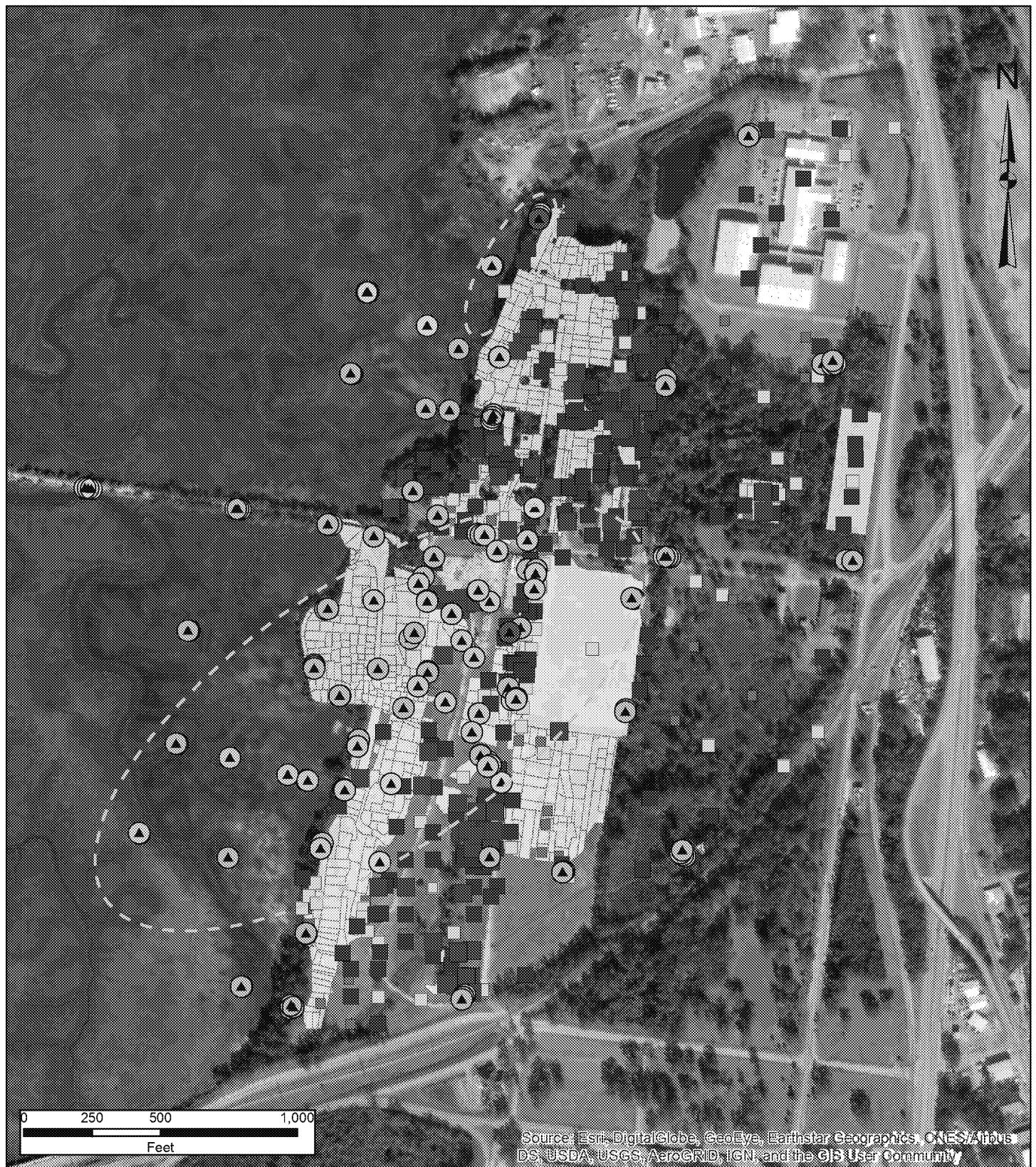
- ND
- < 28.6 (SSSL)
- 28.6 - 286
- 286 - 2,860
- > 2,860

Geochemically-Altered  
Groundwater

Soil Removal

### Comparison of Vadose Zone Soil Lead to SSSL

*LCP Chemicals Site  
Brunswick, GA*



## Comparative Review of Vadose Zone Lead & Groundwater

LCP Chemicals Site  
Brunswick, GA



**Mercury (mg/kg)**

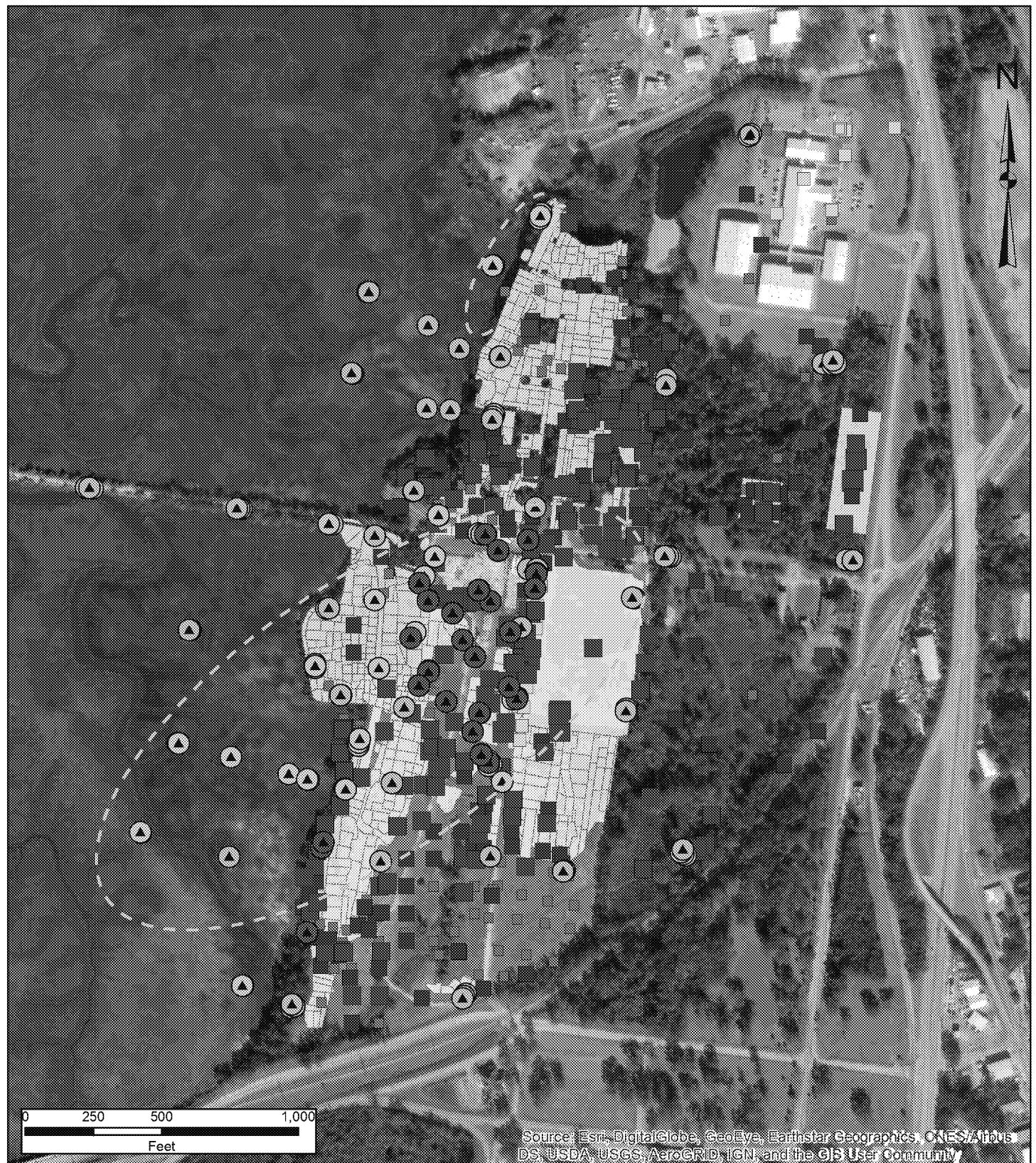
- ND
- < 0.2 (SSSL)
- 0.2 - 2
- 2 - 20
- > 20

Geochemically-Altered  
Groundwater

Soil Removal

### Comparison of Vadose Zone Soil Mercury to SSSL

*LCP Chemicals Site  
Brunswick, GA*



**Mercury (mg/kg)**

- ND
- < 0.2 (SSSL)
- 0.2 - 2
- 2 - 20
- > 20

**2012 GW Mercury (µg/L)**

- ND
- < 2 (MCL)
- 2 - 20
- > 20

Geochemically-Altered Groundwater

Soil Removal

## Comparative Review of Vadose Zone Mercury & Groundwater

*LCP Chemicals Site  
Brunswick, GA*



#### Naphthalene (mg/kg)

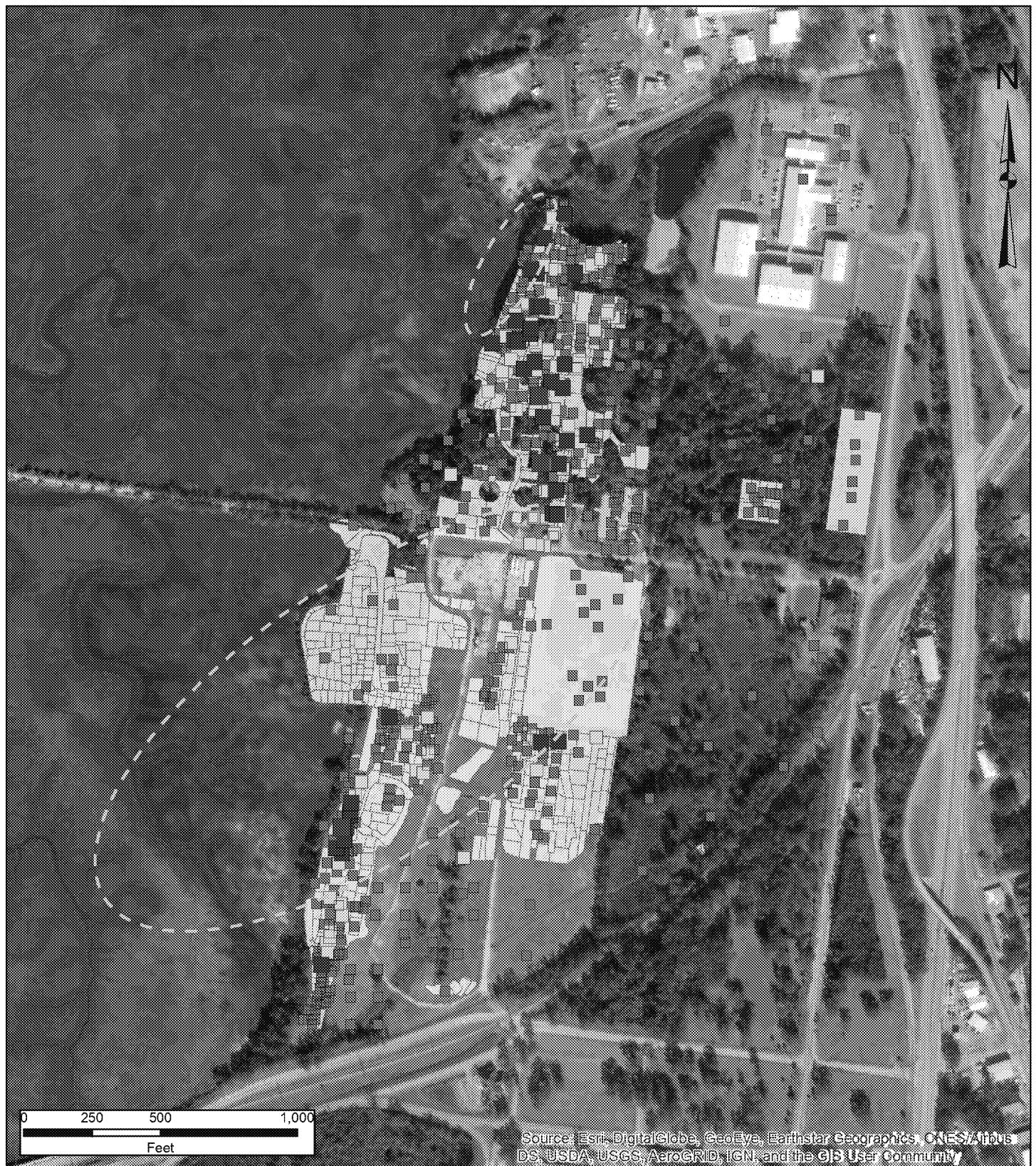
- ND
- < 2.64 (SSSL)
- 2.64 - 26.4
- 26.4 - 264
- > 264

Geochemically-Altered Groundwater

Soil Removal

#### Comparison of Vadose Zone Soil Naphthalene to SSSL

*LCP Chemicals Site  
Brunswick, GA*



#### Naphthalene (mg/kg)

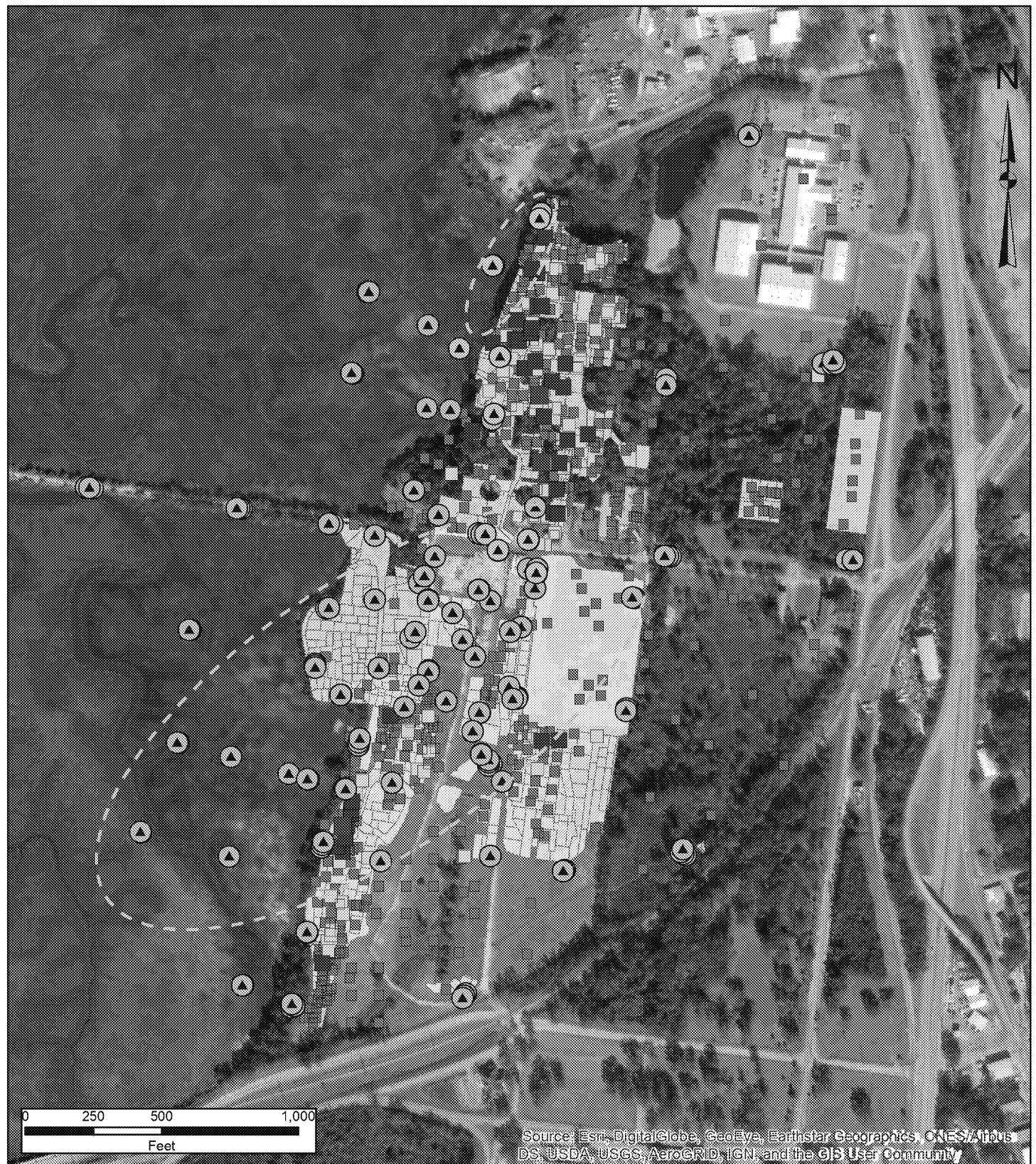
- ND
- < 2.64 (SSSL)
- 2.64 - 26.4
- 26.4 - 264
- > 264

Geochemically-Altered Groundwater

Soil Removal

#### Comparison of Saturated Zone Soil Naphthalene to SSSL

*LCP Chemicals Site  
Brunswick, GA*



Naphthalene (mg/kg)

- ND
- < 2.64 (SSSL)
- 2.64 - 26.4
- 26.4 - 264
- > 264

2012 GW Naphthalene (µg/L)

- ND
- < 100 (LHA)
- 100 - 1,000
- > 1,000

Geochemically-Altered  
Groundwater

Soil Removal

## Comparative Review of Saturated Zone Naphthalene & Groundwater

*LCP Chemicals Site  
Brunswick, GA*



## **APPENDIX A**

### **Risk Calculations for Excavation Worker, Quadrant 4**

**Toxicity Values Worksheet**

Analyte	Surrogate / Form	CAS No.	Oral SF Soil	Inhalation UR/SF Soil	Dermal SF Soil	Oral RfD Soil	Inhalation RfC Soil	Dermal RfD Soil	GIABS	ABS	PEF	VF	
Aluminum		7429905				1.00E+00	5.00E-03	1.00E+00	1	0	1.36E+09		
Antimony	Metallic	7440360				4.00E-04		7.50E-05	0.15	0	1.36E+09		
Aroclor 1254		11097691	2.00E+00	5.70E-04	2.00E+00	2.00E-05		2.00E-05	1	0.14	1.36E+09		
Aroclor 1260		11096825	2.00E+00	5.70E-04	2.00E+00	2.00E-05		2.00E-05	1	0.14	1.36E+09		
Aroclor 1268 - 1254 RfD	Aroclor 1254	11100144	2.00E+00	5.70E-04	2.00E+00	2.00E-05		2.00E-05	1	0.14	1.36E+09		
Aroclor 1268 - 1016 RfD	Aroclor 1016 - noncancer	11100144	2.00E+00	5.70E-04	2.00E+00	7.00E-05		7.00E-05	1	0.14	1.36E+09		
Arsenic, Inorganic	Inorganic	7440382	1.50E+00	4.30E-03	1.50E+00	3.00E-04	1.50E-05	3.00E-04	1	0.03	1.36E+09		
Benz[a]anthracene		56553	7.30E-01	1.10E-04	7.30E-01				1	0.13	1.36E+09		
Benzo[a]pyrene		50328	7.30E+00	1.10E-03	7.30E+00				1	0.13	1.36E+09		
Benzo[b]fluoranthene		205992	7.30E-01	1.10E-04	7.30E-01				1	0.13	1.36E+09		
Benzo[k]fluoranthene		207089	7.30E-02	1.10E-04	7.30E-02				1	0.13	1.36E+09		
Chloroform		67663	3.10E-02	2.30E-05	3.10E-02	1.00E-02	9.80E-02	1.00E-02	1	0	1.36E+09	2.83E+03	
Chromium (VI)		18540299	5.00E-01	8.40E-02	2.00E+01	3.00E-03	1.00E-04	7.50E-05	0.025	0	1.36E+09		
Chrysene		218019	7.30E-03	1.10E-05	7.30E-03				1	0.13	1.36E+09		
Cobalt		7440484		9.00E-03		3.00E-04	6.00E-06	3.00E-04	1	0	1.36E+09		
Dibenz[a,h]anthracene		53703	7.30E+00	1.20E-03	7.30E+00				1	0.13	1.36E+09		
Indeno[1,2,3-cd]pyrene		193395	7.30E-01	1.10E-04	7.30E-01				1	0.13	1.36E+09		
Iron		7439896				7.00E-01		7.00E-01	1	0	1.36E+09		
Manganese	Diet	7439965				1.40E-01	5.00E-05	1.40E-01	1	0	1.36E+09		
Mercury, Inorganic Salts	Inorganic Salts	7487947				3.00E-04		2.10E-05	0.07	0	1.36E+09		
Naphthalene		91203		3.40E-05		2.00E-02	3.00E-03	2.00E-02	1	0.13	1.36E+09	4.99E+04	
Naphthalene, 1-Methyl		90120	2.90E-02			2.90E-02	7.00E-02		7.00E-02	1	0	1.36E+09	6.31E+04
n-butylbenzene	Ethylbenzene	104518	1.10E-02	2.50E-06	1.10E-02	1.00E-01	1.00E+00	1.00E-01	1	0	1.36E+09	6.10E+03	
Tetrachloroethene		127184	0.54	0.0000059	5.40E-01	1.00E-02	0.27	1.00E-02	1	0	1.36E+09		
Trimethylbenzene, 1,2,4-		95636					7.00E-03		1	0	1.36E+09	8.52E+03	
Vanadium	Compounds	7440622					5.00E-03		5.00E-03	1	0	1.36E+09	
Zinc	Metallic	7440666					3.00E-01		3.00E-01	1	0	1.36E+09	

## Equations Worksheet

Parameter	(units)	Excavation Worker
BW	(kg)	70
EF	(days/year)	260
EP	(years)	0.5
ET	(hr/d x d/yr)	1
EPC	(mg/kg)	(0-1')
IF <sub>d</sub>	(cm <sup>2</sup> -yr/kg)	2,620
IF <sub>o</sub>	(mg-yr/kg/day)	110
IR <sub>S</sub>	(mg/day)	330
AT nc	(d)	182.5
AT c	(d)	25550
CF	(mg/kg)	0.000001
SA	(cm <sup>2</sup> )	3,300
AF	(mg/cm <sup>2</sup> )	0.3
PEF	(m <sup>3</sup> /kg)	1360000000
IRa	(m <sup>3</sup> /d)	13.3 Prof judgement

Values not previously specified

### Ingestion Intake

$$\frac{CS \times IR \times CF \times EF \times ED}{BW \times AT}$$

#### Excavation Worker

Noncancer	CS x	3.35812E-06
Cancer	CS x	2.39866E-08

### Dermal Intake

$$\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

#### Adult

Noncancer	CS x ABS x	1.00744E-05
Cancer	CS x ABS x	7.19597E-08

### Inhalation Intake

$$\frac{CS \times EF \times ED \times ET \times (1/VF + 1/PEF)}{AT}$$

#### Adult

Noncancer	CS x (1/VF + 1/PEF) x	0.712328767
Cancer	CS x (1/VF + 1/PEF) x	0.005088063

**Table 16E**  
RME Risk Calculations - Excavation Worker - Quadrant 4

Receptor	Parameter	CAS	Tox Surrogate	EPC (mg/kg)	Air EPC (mg/m <sup>3</sup> )	Ingestion		Inhalation		Dermal		Total	
						Hazard	Risk	Hazard	Risk	Hazard	Risk	Hazard	Risk
<b>Excavation Worker</b>													
Aluminum	7429905			8475	6.2E-06	2.8E-02		8.9E-04		0E+00		0.029	
Antimony	7440360			7.074	5.2E-09	5.9E-02				0E+00		0.059	
Aroclor 1254	11097691			0.18	1.3E-10	3.0E-02	8.6E-09		3.8E-16	1.3E-02	3.6E-09	0.043	1.2E-08
Aroclor 1260	11096825	See footnote (1)		1.22	9.0E-10	2.0E-01	5.9E-08		2.6E-15	8.6E-02	2.5E-08	0.29	8.3E-08
Aroclor 1268 - 1016 RfD	11100144	Aroclor1254-1016		4.32	3.2E-09	2.1E-01	2.1E-07		9.2E-15	8.7E-02	8.7E-08	0.29	2.9E-07
Aroclor 1268 - 1254 RfD	11100144	Aroclor1254		4.32	3.2E-09	7.3E-01	2.1E-07		9.2E-15	3.0E-01	8.7E-08	1.03	2.9E-07
Arsenic, Inorganic	7440382			2.669	2.0E-09	3.0E-02	9.6E-08	9.3E-05	4.3E-14	2.7E-03	8.6E-09	0.033	1.0E-07
Benz[a]anthracene	56553			0.569	4.2E-10		1.0E-08		2.3E-16		3.9E-09		1.4E-08
Benz[a]pyrene	50328			0.436	3.2E-10		7.6E-08		1.8E-15		3.0E-08		1.1E-07
Benz[b]fluoranthene	205992			0.362	2.7E-10		6.3E-09		1.5E-16		2.5E-09		8.8E-09
Benz[k]fluoranthene	207089			0.184	1.4E-10		3.2E-10		7.6E-17		1.3E-10		4.5E-10
Chloroform	67663			0.0247	8.7E-06	8.3E-06	1.8E-11	6.3E-05	1.0E-12	0E+00	0E+00	0.0001	1.9E-11
Chromium	18540299			16.78	1.2E-08	1.9E-02	2.0E-07	8.8E-05	5.3E-12	0E+00	0E+00	0.019	2.0E-07
Chrysene	218019			0.688	5.1E-10		1.2E-10		2.8E-17		4.7E-11		1.7E-10
Cobalt	7440484			0.543	4.0E-10	6.1E-03		4.7E-05	1.8E-14	0E+00		0.006	1.8E-14
Dibenz[a,h]anthracene	53703			0.254	1.9E-10		4.4E-08		1.1E-15		1.7E-08		6.2E-08
Indeno[1,2,3-cd]pyrene	193395			0.166	1.2E-10		2.9E-09		6.8E-17		1.1E-09		4.0E-09
Iron	7439896			6880	5.1E-06	3.3E-02				0E+00		0.033	
Manganese	7439965			140.6	1.0E-07	3.4E-03		1.5E-03		0E+00		0.005	
Mercury, Inorganic Salts	7487947			8.927	6.6E-09	1.0E-01				0E+00		0.10	
Naphthalene	91203			0.258	5.2E-06	4.3E-05		1.2E-03	8.9E-13	1.7E-05		0.001	8.9E-13
Naphthalene, 1-Methyl	90120			1.513	2.4E-05	7.3E-05	1.1E-09			0E+00	0E+00	0.0001	1.1E-09
n-Butylbenzene	104518	Ethylbenzene		1.996	3.3E-04	6.7E-05	5.3E-10	2.3E-04	4.2E-12	0E+00	0E+00	0.0003	5.3E-10
Tetrachloroethene	127184			0.0283	2.1E-11	9.5E-06	3.7E-10	5.5E-11	6.2E-19	0E+00	0E+00	0.00001	3.7E-10
Trimethylbenzene, 1,2,4-	95636			0.762	8.9E-05			9.1E-03				0.009	
Vanadium	7440622			23.55	1.7E-08	1.6E-02				0E+00		0.016	
Zinc	7440666			1149	8.4E-07	1.3E-02				0E+00		0.013	
<b>Cumulative Hazard/Risk</b>						7.5E-01	7.1E-07	1.3E-02	1.1E-11	1.9E-01	1.8E-07	0.95	8.9E-07

**Notes:**

Green highlight indicates those EPC values which were updated from the HHBRA with new sample results.

(1) The EPC for Aroclor 1260 was calculated using 1/2 the detection limit due to the low number of actual detections (following ProUCL recommendation).

The total Hazard using Aroclor 1254 RfD as the surrogate for Aroclor 1268 toxicity is 1.69.

	A	B	C	D	E	F	G	H	I	J	K	L											
1	UCL Statistics for Data Sets with Non-Detects																						
2																							
3	User Selected Options																						
4	Date/Time of Computation	ProJCL 5.19/12/2018 3:03:20 PM																					
5	From File	Quad4_input_woTEG_COPC_Rev.xls																					
6	Full Precision	OFF																					
7	Confidence Coefficient	95%																					
8	Number of Bootstrap Operations	2000																					
9																							
10	Rev_Aroclor-1254																						
11																							
12	General Statistics																						
13	Total Number of Observations	364		Number of Distinct Observations		145																	
14	Number of Detects	25		Number of Non-Detects		339																	
15	Number of Distinct Detects	25		Number of Distinct Non-Detects		122																	
16	Minimum Detect	0.0032		Minimum Non-Detect		0.0017																	
17	Maximum Detect	6.9		Maximum Non-Detect		12																	
18	Variance Detects	2.862		Percent Non-Detects		93.13%																	
19	Mean Detects	1.071		SD Detects		1.692																	
20	Median Detects	0.27		CV Detects		1.579																	
21	Skewness Detects	2.096		Kurtosis Detects		4.812																	
22	Mean of Logged Detects	-1.92		SD of Logged Detects		2.571																	
23																							
24	Normal GOF Test on Detects Only																						
25	Shapiro Wilk Test Statistic	0.688		Shapiro Wilk GOF Test																			
26	5% Shapiro Wilk Critical Value	0.918		Detected Data Not Normal at 5% Significance Level																			
27	Lilliefors Test Statistic	0.292		Lilliefors GOF Test																			
28	5% Lilliefors Critical Value	0.173		Detected Data Not Normal at 5% Significance Level																			
29	Detected Data Not Normal at 5% Significance Level																						
30																							
31	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs																						
32	KM Mean	0.114		KM Standard Error of Mean		0.0332																	
33	KM SD	0.538		95% KM (BCA) UCL		0.172																	
34	95% KM (t) UCL	0.168		95% KM (Percentile Bootstrap) UCL		0.171																	
35	95% KM (z) UCL	0.168		95% KM Bootstrap t UCL		0.187																	
36	90% KM Chebyshev UCL	0.213		95% KM Chebyshev UCL		0.258																	
37	97.5% KM Chebyshev UCL	0.321		99% KM Chebyshev UCL		0.444																	
38																							
39	Gamma GOF Tests on Detected Observations Only																						
40	A-D Test Statistic	0.683		Anderson-Darling GOF Test																			
41	5% A-D Critical Value	0.843		Detected data appear Gamma Distributed at 5% Significance Level																			
42	K-S Test Statistic	0.156		Kolmogorov-Smirnov GOF																			
43	5% K-S Critical Value	0.189		Detected data appear Gamma Distributed at 5% Significance Level																			
44	Detected data appear Gamma Distributed at 5% Significance Level																						
45																							
46	Gamma Statistics on Detected Data Only																						
47	k hat (MLE)	0.34		k star (bias corrected MLE)		0.326																	
48	Theta hat (MLE)	3.154		Theta star (bias corrected MLE)		3.29																	
49	nu hat (MLE)	16.99		nu star (bias corrected)		16.28																	
50	Mean (detects)	1.071																					
51																							

	A	B	C	D	E	F	G	H	I	J	K	L						
52	<b>Gamma ROS Statistics using Imputed Non-Detects</b>																	
53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs																	
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)																	
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs																	
56	This is especially true when the sample size is small.																	
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates																	
58	Minimum	0.0032					Mean	0.0901										
59	Maximum	6.9					Median	0.01										
60	SD	0.512					CV	5.684										
61	k hat (MLE)	0.351					k star (bias corrected MLE)	0.35										
62	Theta hat (MLE)	0.257					Theta star (bias corrected MLE)	0.258										
63	nu hat (MLE)	255.4					nu star (bias corrected)	254.6										
64	Adjusted Level of Significance ( $\beta$ )	0.0493																
65	Approximate Chi Square Value (254.64, $\alpha$ )	218.7					Adjusted Chi Square Value (254.64, $\beta$ )	218.6										
66	95% Gamma Approximate UCL (use when n>=50)	0.105					95% Gamma Adjusted UCL (use when n<50)	0.105										
67																		
68	<b>Estimates of Gamma Parameters using KM Estimates</b>																	
69	Mean (KM)	0.114					SD (KM)	0.538										
70	Variance (KM)	0.29					SE of Mean (KM)	0.0332										
71	k hat (KM)	0.0445					k star (KM)	0.046										
72	nu hat (KM)	32.42					nu star (KM)	33.48										
73	theta hat (KM)	2.551					theta star (KM)	2.47										
74	80% gamma percentile (KM)	0.0113					90% gamma percentile (KM)	0.154										
75	95% gamma percentile (KM)	0.585					99% gamma percentile (KM)	2.552										
76																		
77	<b>Gamma Kaplan-Meier (KM) Statistics</b>																	
78	Approximate Chi Square Value (33.48, $\alpha$ )	21.25					Adjusted Chi Square Value (33.48, $\beta$ )	21.21										
79	95% Gamma Approximate KM-UCL (use when n>=50)	0.179					95% Gamma Adjusted KM-UCL (use when n<50)	0.179										
80																		
81	<b>Lognormal GOF Test on Detected Observations Only</b>																	
82	Shapiro Wilk Test Statistic	0.914					<b>Shapiro Wilk GOF Test</b>											
83	5% Shapiro Wilk Critical Value	0.918					Detected Data Not Lognormal at 5% Significance Level											
84	Lilliefors Test Statistic	0.135					<b>Lilliefors GOF Test</b>											
85	5% Lilliefors Critical Value	0.173					Detected Data appear Lognormal at 5% Significance Level											
86	<b>Detected Data appear Approximate Lognormal at 5% Significance Level</b>																	
87																		
88	<b>Lognormal ROS Statistics Using Imputed Non-Detects</b>																	
89	Mean in Original Scale	0.079					Mean in Log Scale	-6.464										
90	SD in Original Scale	0.512					SD in Log Scale	2.324										
91	95% t UCL (assumes normality of ROS data)	0.123					95% Percentile Bootstrap UCL	0.125										
92	95% BCA Bootstrap UCL	0.14					95% Bootstrap t UCL	0.157										
93	95% H-UCL (Log ROS)	0.0353																
94																		
95	<b>Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution</b>																	
96	KM Mean (logged)	-5.223					KM Geo Mean	0.00539										
97	KM SD (logged)	1.817					95% Critical H Value (KM-Log)	2.909										
98	KM Standard Error of Mean (logged)	0.211					95% H-UCL (KM -Log)	0.0371										
99	KM SD (logged)	1.817					95% Critical H Value (KM-Log)	2.909										
100	KM Standard Error of Mean (logged)	0.211																
101																		
102	<b>DL/2 Statistics</b>																	
103	<b>DL/2 Normal</b>				<b>DL/2 Log-Transformed</b>													
104	Mean in Original Scale	0.9					Mean in Log Scale	-1.028										
105	SD in Original Scale	0.705					SD in Log Scale	2.071										
106	95% t UCL (Assumes normality)	0.961					95% H-Stat UCL	4.316										
107	<b>DL/2 is not a recommended method, provided for comparisons and historical reasons</b>																	

	A	B	C	D	E	F	G	H	I	J	K	L
108												
109												
110												
111												
112												
113												
114												
115												
116												
117												
118												
119												
120	Rev_Aroclor-1260											
121												
122												
123												
124												
125												
126												
127												
128												
129												
130												
131												
132												
133	Rev_Aroclor-1268											
134												
135												
136												
137												
138												
139												
140												
141												
142												
143												
144												
145												
146												
147												
148												
149												
150												
151												
152												
153												
154												
155												
156												
157												
158												
159												
160												
161												
162												

	A	B	C	D	E	F	G	H	I	J	K	L					
163	<b>Gamma GOF Tests on Detected Observations Only</b>																
164					A-D Test Statistic	3.035		<b>Anderson-Darling GOF Test</b>									
165					5% A-D Critical Value	0.856		Detected Data Not Gamma Distributed at 5% Significance Level									
166					K-S Test Statistic	0.155		<b>Kolmogorov-Smirnov GOF</b>									
167					5% K-S Critical Value	0.0929		Detected Data Not Gamma Distributed at 5% Significance Level									
168	Detected Data Not Gamma Distributed at 5% Significance Level																
169																	
170	<b>Gamma Statistics on Detected Data Only</b>																
171					k hat (MLE)	0.347		k star (bias corrected MLE) 0.344									
172					Theta hat (MLE)	18.71		Theta star (bias corrected MLE) 18.89									
173					nu hat (MLE)	78.39		nu star (bias corrected) 77.64									
174					Mean (detects)	6.49											
175																	
176	<b>Gamma ROS Statistics using Imputed Non-Detects</b>																
177	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs																
178	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)																
179	For such situations, GROS method may yield incorrect values of UCLs and BTVs																
180	This is especially true when the sample size is small.																
181	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates																
182					Minimum	0.0036		Mean 2.071									
183					Maximum	240		Median 0.01									
184					SD	13.69		CV 6.613									
185					k hat (MLE)	0.191		k star (bias corrected MLE) 0.192									
186					Theta hat (MLE)	10.82		Theta star (bias corrected MLE) 10.8									
187					nu hat (MLE)	136.3		nu star (bias corrected) 136.5									
188					Adjusted Level of Significance ( $\beta$ )	0.0493											
189					Approximate Chi Square Value (136.48, $\alpha$ )	110.5		Adjusted Chi Square Value (136.48, $\beta$ ) 110.4									
190					95% Gamma Approximate UCL (use when n>=50)	2.558		95% Gamma Adjusted UCL (use when n<50) 2.56									
191																	
192	<b>Estimates of Gamma Parameters using KM Estimates</b>																
193					Mean (KM)	2.256		SD (KM) 13.66									
194					Variance (KM)	186.5		SE of Mean (KM) 0.728									
195					k hat (KM)	0.0273		k star (KM) 0.0289									
196					nu hat (KM)	19.43		nu star (KM) 20.6									
197					theta hat (KM)	82.66		theta star (KM) 77.97									
198					80% gamma percentile (KM)	0.02		90% gamma percentile (KM) 1.192									
199					95% gamma percentile (KM)	8.432		99% gamma percentile (KM) 58.79									
200																	
201	<b>Gamma Kaplan-Meier (KM) Statistics</b>																
202					Approximate Chi Square Value (20.60, $\alpha$ )	11.29		Adjusted Chi Square Value (20.60, $\beta$ ) 11.27									
203					95% Gamma Approximate KM-UCL (use when n>=50)	4.114		95% Gamma Adjusted KM-UCL (use when n<50) 4.124									
204																	
205	<b>Lognormal GOF Test on Detected Observations Only</b>																
206					Shapiro Wilk Approximate Test Statistic	0.966		<b>Shapiro Wilk GOF Test</b>									
207					5% Shapiro Wilk P Value	0.0532		Detected Data appear Lognormal at 5% Significance Level									
208					Lilliefors Test Statistic	0.121		<b>Lilliefors GOF Test</b>									
209					5% Lilliefors Critical Value	0.0837		Detected Data Not Lognormal at 5% Significance Level									
210					Detected Data appear Approximate Lognormal at 5% Significance Level												
211																	
212	<b>Lognormal ROS Statistics Using Imputed Non-Detects</b>																
213					Mean in Original Scale	2.155		Mean in Log Scale -1.969									
214					SD in Original Scale	13.68		SD in Log Scale 2.155									
215					95% t UCL (assumes normality of ROS data)	3.351		95% Percentile Bootstrap UCL 3.497									
216					95% BCA Bootstrap UCL	4.344		95% Bootstrap t UCL 5.511									
217					95% H-UCL (Log ROS)	2.072											
218																	

A	B	C	D	E	F	G	H	I	J	K	L
219 Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
220	KM Mean (logged)	-2.019					KM Geo Mean	0.133			
221	KM SD (logged)	2.456					95% Critical H Value (KM-Log)	3.581			
222	KM Standard Error of Mean (logged)	0.214					95% H-UCL (KM -Log)	4.32			
223	KM SD (logged)	2.456					95% Critical H Value (KM-Log)	3.581			
224	KM Standard Error of Mean (logged)	0.214									
225											
226	227 DL/2 Statistics										
228	227 DL/2 Normal			DL/2 Log-Transformed							
229	Mean in Original Scale	2.759					Mean in Log Scale	-0.268			
230	SD in Original Scale	13.6					SD in Log Scale	1.696			
231	95% t UCL (Assumes normality)	3.948					95% H-Stat UCL	4.138			
232	231 DL/2 is not a recommended method, provided for comparisons and historical reasons										
233	232 Nonparametric Distribution Free UCL Statistics										
234	233 Detected Data appear Approximate Lognormal Distributed at 5% Significance Level										
235	234 Suggested UCL to Use										
236	KM H-UCL	4.32									
237	238 Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
239	240 Recommendations are based upon data size, data distribution, and skewness.										
241	241 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).										
242	242 However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.										
243											

	A	B	C	D	E	F	G	H	I	J	K	L											
1	<b>UCL Statistics for Uncensored Full Data Sets</b>																						
2																							
3	User Selected Options																						
4	Date/Time of Computation	ProUCL 5.19/6/2018 11:31:31 AM																					
5	From File	Quad4_input_woTEG_COPC_Rev.xls																					
6	Full Precision	OFF																					
7	Confidence Coefficient	95%																					
8	Number of Bootstrap Operations	2000																					
9																							
10																							
87	<b>Rev_Half_Aroclor-1260</b>																						
88																							
89	<b>General Statistics</b>																						
90	Total Number of Observations	364										Number of Distinct Observations 134											
91												Number of Missing Observations 0											
92	Minimum	0.00105										Mean 0.906											
93	Maximum	25										Median 1.115											
94	SD	1.397										Std. Error of Mean 0.0732											
95	Coefficient of Variation	1.542										Skewness 14.28											
96																							
97	<b>Normal GOF Test</b>																						
98	Shapiro Wilk Test Statistic	0.289										Shapiro Wilk GOF Test											
99	5% Shapiro Wilk P Value	0										Data Not Normal at 5% Significance Level											
100	Lilliefors Test Statistic	0.357										Lilliefors GOF Test											
101	5% Lilliefors Critical Value	0.0468										Data Not Normal at 5% Significance Level											
102	Data Not Normal at 5% Significance Level																						
103																							
104	<b>Assuming Normal Distribution</b>																						
105	95% Normal UCL				95% UCLs (Adjusted for Skewness)																		
106	95% Student's-t UCL	1.027										95% Adjusted-CLT UCL (Chen-1995) 1.085											
107												95% Modified-t UCL (Johnson-1978) 1.036											
108																							
109	<b>Gamma GOF Test</b>																						
110	A-D Test Statistic	56.37										Anderson-Darling Gamma GOF Test											
111	5% A-D Critical Value	0.812										Data Not Gamma Distributed at 5% Significance Level											
112	K-S Test Statistic	0.395										Kolmogorov-Smirnov Gamma GOF Test											
113	5% K-S Critical Value	0.0501										Data Not Gamma Distributed at 5% Significance Level											
114	Data Not Gamma Distributed at 5% Significance Level																						
115																							
116	<b>Gamma Statistics</b>																						
117	k hat (MLE)	0.603										k star (bias corrected MLE) 0.6											
118	Theta hat (MLE)	1.502										Theta star (bias corrected MLE) 1.51											
119	nu hat (MLE)	439										nu star (bias corrected) 436.7											
120	MLE Mean (bias corrected)	0.906										MLE Sd (bias corrected) 1.17											
121												Approximate Chi Square Value (0.05) 389.2											
122	Adjusted Level of Significance	0.0493										Adjusted Chi Square Value 389.1											
123																							
124	<b>Assuming Gamma Distribution</b>																						
125	95% Approximate Gamma UCL (use when n>=50)	1.016										95% Adjusted Gamma UCL (use when n<50) 1.017											
126																							

	A	B	C	D	E	F	G	H	I	J	K	L			
127	<b>Lognormal GOF Test</b>														
128	Shapiro Wilk Test Statistic				0.674	<b>Shapiro Wilk Lognormal GOF Test</b>									
129	5% Shapiro Wilk P Value				0	Data Not Lognormal at 5% Significance Level									
130	Lilliefors Test Statistic				0.403	<b>Lilliefors Lognormal GOF Test</b>									
131	5% Lilliefors Critical Value				0.0468	Data Not Lognormal at 5% Significance Level									
132	<b>Data Not Lognormal at 5% Significance Level</b>														
133															
134	<b>Lognormal Statistics</b>														
135	Minimum of Logged Data				-6.864										
136	Maximum of Logged Data				3.219										
137															
138	<b>Assuming Lognormal Distribution</b>														
139	95% H-UCL				4.297										
140	95% Chebyshev (MVUE) UCL				5.42										
141	99% Chebyshev (MVUE) UCL				8.589										
142															
143	<b>Nonparametric Distribution Free UCL Statistics</b>														
144	Data do not follow a Discernible Distribution (0.05)														
145															
146	<b>Nonparametric Distribution Free UCLs</b>														
147	95% CLT UCL				1.026										
148	95% Standard Bootstrap UCL				1.027										
149	95% Hall's Bootstrap UCL				1.548										
150	95% BCA Bootstrap UCL				1.111										
151	90% Chebyshev(Mean, Sd) UCL				1.126										
152	97.5% Chebyshev(Mean, Sd) UCL				1.363										
153															
154	<b>Suggested UCL to Use</b>														
155	95% Chebyshev (Mean, Sd) UCL				1.225										
156															
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.														
158	Recommendations are based upon data size, data distribution, and skewness.														
159	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).														
160	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.														
205															



## **APPENDIX B**

### **Construction Worker Risk Calculations Adjusted for Intermediate Oral Exposure to PCBs**

### Toxicity Values Worksheet

Analyte	Surrogate / Form	CAS No.	Oral SF Soil	Inhalation UR/SF Soil	Dermal SF Soil	Oral RfD Soil	Inhalation RfC Soil	Dermal RfD Soil	GIABS	ABS	PEF	VF
Aldrin		309002	1.70E+01	4.90E-03	1.70E+01	3.00E-05		3.00E-05	1	0.1	1.36E+09	
Aluminum		7429905			1.00E+00	5.00E-03	1.00E+00	1.00E+00	1	0	1.36E+09	
Antimony	Metallic	7440360			4.00E-04		7.50E-05	0.15	0	1.36E+09		
Aroclor 1016		12674112	7.00E-02	2.00E-05	7.00E-02	7.00E-05		7.00E-05	1	0.14	1.36E+09	
Aroclor 1221		11104282	2.00E+00	5.70E-04	2.00E+00	3.00E-05		2.00E-05	1	0.14	1.36E+09	9.16E+04
Aroclor 1254		11097691	2.00E+00	5.70E-04	2.00E+00	3.00E-05		2.00E-05	1	0.14	1.36E+09	
Aroclor 1260		11096825	2.00E+00	5.70E-04	2.00E+00	3.00E-05		2.00E-05	1	0.14	1.36E+09	
Aroclor 1268 - 1254 RfD	Aroclor 1254	11100144	2.00E+00	5.70E-04	2.00E+00	3.00E-05		2.00E-05	1	0.14	1.36E+09	
Aroclor 1268 - 1016 RfD	Aroclor 1016 - noncancer	11100144	2.00E+00	5.70E-04	2.00E+00	7.00E-05		7.00E-05	1	0.14	1.36E+09	
Arsenic, Inorganic	Inorganic	7440382	1.50E+00	4.30E-03	1.50E+00	3.00E-04	1.50E-05	3.00E-04	1	0.03	1.36E+09	
Benzene		71432	5.50E-02	7.80E-06	5.50E-02	4.00E-03	3.00E-02	4.00E-03	1	0	1.36E+09	3.81E+03
Benz[a]anthracene		56553	7.30E-01	1.10E-04	7.30E-01				1	0.13	1.36E+09	
Benzo[a]pyrene		50328	7.30E+00	1.10E-03	7.30E+00				1	0.13	1.36E+09	
Benzo[b]fluoranthene		205992	7.30E-01	1.10E-04	7.30E-01				1	0.13	1.36E+09	
Benzo[k]fluoranthene		207089	7.30E-02	1.10E-04	7.30E-02				1	0.13	1.36E+09	
Benzo[b,k]fluoranthene	Benzo(b)fluoranthene	NA	7.30E-02	1.10E-04	7.30E-02				1	0.13	1.36E+09	
bis(2-Chloroethyl) ether		111444	1.10E+00	3.30E-04	1.10E+00				1	0	1.36E+09	
Bis(2-ethylhexyl)phthalate		117817	1.40E-02	2.40E-06	1.40E-02	2.00E-02		2.00E-02	1	0.1	1.36E+09	
Cadmium	Diet	7440439		1.80E-03		1.00E-03	1.00E-05	2.50E-05	0.025	0.001	1.36E+09	
Carbazole		86748	2.00E-02		2.00E-02				1	0.01	1.36E+09	
Chloroform		67663	3.10E-02	2.30E-05	3.10E-02	1.00E-02	9.80E-02	1.00E-02	1	0	1.36E+09	2.83E+03
Chromium (VI)		18540299	5.00E-01	8.40E-02	2.00E+01	3.00E-03	1.00E-04	7.50E-05	0.025	0	1.36E+09	
Chrysene		218019	7.30E-03	1.10E-05	7.30E-03				1	0.13	1.36E+09	
Cobalt		7440484		9.00E-03		3.00E-04	6.00E-06	3.00E-04	1	0	1.36E+09	
DDT	4,4'	50293	3.40E-01	9.70E-05	3.40E-01	5.00E-04		5.00E-04	1	0.03	1.36E+09	
Dibenz[a,h]anthracene		53703	7.30E+00	1.20E-03	7.30E+00				1	0.13	1.36E+09	
Dibenzofuran		132649				1.00E-03		1.00E-03	1	0	1.36E+09	2.11E+05
Dibromochloromethane		124481	8.40E-02	2.70E-05	8.40E-02	2.00E-02		2.00E-02	1	0.1	1.36E+09	8.55E+03
Dichlorobenzene, 1,4-		106467	5.40E-03	1.10E-05	5.40E-03	7.00E-02	8.00E-01	7.00E-02	1	0	1.36E+09	1.12E+04
Dieldrin		60571	1.60E+01	4.60E-03	1.60E+01	5.00E-05		5.00E-05	1	0.1	1.36E+09	
4,6-Dinitro-2-methylphenol		534521				8.00E-05		8.00E-05	1	0.1	1.36E+09	
Endrin		72208				3.00E-04		3.00E-04	1	0.1	1.36E+09	
Ethylbenzene		100414	1.10E-02	2.50E-06	1.10E-02	1.00E-01	1.00E+00	1.00E-01	1	0	1.36E+09	6.10E+03
Hexachlorocyclohexane, Alpha-		319846	6.30E+00	1.80E-03	6.49E+00				0.1	0.13	1.36E+09	
Iron		7439896				7.00E-01		7.00E-01	1	0	1.36E+09	
Manganese	Diet	7439965				1.40E-01	5.00E-05	1.40E-01	1	0	1.36E+09	
Mercury, Inorganic Salts	Inorganic Salts	7487947				3.00E-04		2.10E-05	0.07	0	1.36E+09	
Methylene Chloride		75092	7.50E-03	4.70E-07	7.50E-03	6.00E-02	1.00E+00	6.00E-02	1	0	1.36E+09	2.36E+03
Naphthalene		91203		3.40E-05		2.00E-02	3.00E-03	2.00E-02	1	0.13	1.36E+09	4.99E+04
Nitrobenzene		98953		4.00E-05		2.00E-03	9.00E-03	2.00E-03	1	0	1.36E+09	7.88E+04
n-butylbenzene	Ethylbenzene	104518	1.10E-02	2.50E-06	1.10E-02	1.00E-01	1.00E+00	1.00E-01	1	0	1.36E+09	6.10E+03
n-Propylbenzene	Ethylbenzene	103651	1.10E-02	2.50E-06	1.10E-02	1.00E-01	1.00E+00	1.00E-01	1	0	1.36E+09	6.10E+03
Indeno[1,2,3-cd]pyrene		193395	7.30E-01	1.10E-04	7.30E-01				1	0.13	1.36E+09	
Naphthalene, 1-Methyl		90120	2.90E-02		2.90E-02	7.00E-02		7.00E-02	1	0	1.36E+09	6.31E+04
Naphthalene, 2-Methyl		91576				4.00E-03		4.00E-03	1	0	1.36E+09	6.24E+04
Pyrene		129000				3.00E-02		3.00E-02	1	0.13	1.36E+09	2.56E+06
Tetrachloroethene		127184	0.54	0.0000059	5.40E-01	1.00E-02	0.27	1.00E-02	1	0	1.36E+09	
Tetrachloroethane, 1,1,2,2-		79345	2.00E-01	0.000058	2.00E-01	2.00E-02		2.00E-02	1	0	1.36E+09	
Thallium	Soluble Salts	7440280							1	0	1.36E+09	
Trimethylbenzene, 1,2,4-		95636					7.00E-03		1	0	1.36E+09	8.52E+03
Trimethylbenzene, 1,3,5-		108678				1.00E-02		1.00E-02	1	0	1.36E+09	7.12E+03
Vanadium	Compounds	7440622							1	0	1.36E+09	
Vanadium Pentoxide	Pentoxide	1314621		0.0083		9.00E-03	0.000007	2.34E-04	0.026	0	1.36E+09	
Zinc	Metallic	7440666				3.00E-01		3.00E-01	1	0	1.36E+09	

Notes:

Updated to ATSDR Minimal Risk Level for intermediate exposure to PCBs via oral route. ATSDR defines intermediate exposure as no greater than 1-year exposure duration.

Parameter	(units)	Excavation Worker
BW	(kg)	70
EF	(days/year)	260
EP	(years)	0.5
ET	(hr/d x d/yr)	1
EPC	(mg/kg)	(0-1')
IF <sub>d</sub>	(cm <sup>2</sup> -yr/kg)	2,620
IF <sub>o</sub>	(mg-yr/kg/day)	110
IR <sub>S</sub>	(mg/day)	330
AT nc	(d)	182.5
AT c	(d)	25550
CF	(mg/kg)	0.000001
SA	(cm <sup>2</sup> )	3,300
AF	(mg/cm <sup>2</sup> )	0.3
PEF	(m <sup>3</sup> /kg)	1360000000
IRa	(m <sup>3</sup> /d)	13.3
		Prof judgement

Ingestion Intake

$$\frac{CS \times IR \times CF \times EF \times ED}{BW \times AT}$$

	Excavation Worker	
Noncancer	CS x	3.35812E-06
Cancer	CS x	2.39866E-08

Dermal Intake

$$\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

	Adult	
Noncancer	CS x ABS x	1.00744E-05
Cancer	CS x ABS x	7.19597E-08

Inhalation Intake

$$\frac{CS \times EF \times ED \times ET \times (1/VF + 1/PEF)}{AT}$$

	Adult	
Noncancer	CS x (1/VF + 1/PEF) x	0.712328767
Cancer	CS x (1/VF + 1/PEF) x	0.005088063

**Table 16B**  
**RME Risk Calculations - Excavation Worker - Quadrant 1**

Receptor	Parameter	CAS	Tox Surrogate	EPC (mg/kg)	Air EPC (mg/m³)	Ingestion		Inhalation		Dermal		Total	
						Hazard	Risk	Hazard	Risk	Hazard	Risk	Hazard	Risk
<b>Excavation Worker</b>													
Aroclor 1260	11096825			0.124	9.1E-11	1.4E-02	5.9E-09		2.6E-16	8.7E-03	2.5E-09	0.023	8.4E-09
Aroclor 1268 - 1016 RFD	11100144	Aroclor1254-1016		0.127	9.3E-11	6.1E-03	6.1E-09		2.7E-16	2.6E-03	2.6E-09	0.009	8.7E-09
Aroclor 1268 - 1254 RFD	11100144	Aroclor1254		0.127	9.3E-11	1.4E-02	6.1E-09		2.7E-16	9.0E-03	2.6E-09	0.023	8.7E-09
Arsenic, Inorganic	7440382			1.094	8.0E-10	1.2E-02	3.9E-08	3.8E-05	1.8E-14	1.1E-03	3.5E-09	0.013	4.3E-08
Benz[a]anthracene	56553			0.171	1.3E-10		3.0E-09		7.0E-17		1.2E-09		4.2E-09
Benzo[a]pyrene	50328			0.143	1.1E-10		2.5E-08		5.9E-16		9.8E-09		3.5E-08
Benzo[b/k]fluoranthene	205992			0.413	3.0E-10		7.2E-10		1.7E-16		2.8E-10		1.0E-09
Benzo[b]fluoranthene	205992			0.104	7.6E-11		1.8E-09		4.3E-17		7.1E-10		2.5E-09
Bis(2-ethylhexyl)phthalate	117817			2.57	1.9E-09	4.3E-04	8.6E-10		2.3E-17	1.3E-04	2.6E-10	0.0006	1.1E-09
Chromium	18540299			4.98	3.7E-09	5.6E-03	6.0E-08	2.6E-05	1.6E-12	0E+00	0E+00	0.006	6.0E-08
Dibenz[a,h]anthracene	53703			0.0175	1.3E-11		3.1E-09		7.9E-17		1.2E-09		4.3E-09
Indeno[1,2,3-cd]pyrene	193395			0.0741	5.4E-11		1.3E-09		3.0E-17		5.1E-10		1.8E-09
Iron	7439896			6198	4.6E-06	3.0E-02				0E+00		0.030	
Mercury, Inorganic Salts	7487947			5.478	4.0E-09	6.1E-02				0E+00		0.061	
Vanadium	7440622			7.829	5.8E-09	5.3E-03				0E+00		0.01	
Total (Low Aroclor-1268)						1.3E-01	1.5E-07	6.4E-05	1.6E-12	1.3E-02	2.2E-08	0.15	1.7E-07
Total (High Aroclor-1268)						1.4E-01	1.5E-07	6.4E-05	1.6E-12	1.9E-02	2.2E-08	0.16	1.7E-07

**Table 16C**  
**RME Risk Calculations - Excavation Worker - Quadrant 2**

Receptor	Parameter	CAS	Tox Surrogate	EPC (mg/kg)	Air EPC (mg/m <sup>3</sup> )	Ingestion		Inhalation		Dermal		Total	
						Hazard	Risk	Hazard	Risk	Hazard	Risk	Hazard	Risk
<b>Excavation Worker</b>													
Aroclor 1221	11104282			0.27	2.9E-06	3.0E-02	1.3E-08		8.5E-12	1.9E-02	5.4E-09	0.049	1.8E-08
Aroclor 1254	11097691			0.636	4.7E-10	7.1E-02	3.1E-08		1.4E-15	4.5E-02	1.3E-08	0.12	4.3E-08
Aroclor 1260	11096825			1.214	8.9E-10	1.4E-01	5.8E-08		2.6E-15	8.6E-02	2.4E-08	0.22	8.3E-08
Aroclor 1268 - 1016 RfD	11100144	Aroclor1254-1016		2.94	2.2E-09	1.4E-01	1.4E-07		6.3E-15	5.9E-02	5.9E-08	0.20	2.0E-07
Aroclor 1268 - 1254 RfD	11100144	Aroclor1254		2.94	2.2E-09	3.3E-01	1.4E-07		6.3E-15	2.1E-01	5.9E-08	0.54	2.0E-07
Arsenic, Inorganic	7440382			1.256	9.2E-10	1.4E-02	4.5E-08	4.4E-05	2.0E-14	1.3E-03	4.1E-09	0.015	4.9E-08
Benz[a]anthracene	56553			0.221	1.6E-10		3.9E-09		9.1E-17		1.5E-09		5.4E-09
Benzo[a]pyrene	50328			0.226	1.7E-10		4.0E-08		9.3E-16		1.5E-08		5.5E-08
Benzo[b/k]fluoranthene	205992			0.33	2.4E-10		5.8E-10		1.4E-16		2.3E-10		8.0E-10
Benzo[b]fluoranthene	205992			0.12	8.8E-11		2.1E-09		4.9E-17		8.2E-10		2.9E-09
Carbazole	86748			0.046	3.4E-11		2.2E-11				6.6E-13		2.3E-11
Chromium	18540299			5.48	4.0E-09	6.1E-03	6.6E-08	2.9E-05	1.7E-12	0E+00	0E+00	0.006	6.6E-08
Dibenz[a,h]anthracene	53703			0.148	1.1E-10		2.6E-08		6.6E-16		1.0E-08		3.6E-08
Indeno[1,2,3-cd]pyrene	193395			0.222	1.6E-10		3.9E-09		9.1E-17		1.5E-09		5.4E-09
Iron	7439896			3452	2.5E-06	1.7E-02				0E+00		0.017	
Mercury, Inorganic Salts	7487947			3.759	2.8E-09	4.2E-02				0E+00		0.042	
Total (Low Aroclor-1268)						4.6E-01	4.3E-07	7.3E-05	1.0E-11	2.1E-01	1.4E-07	0.67	5.7E-07
Total (High Aroclor-1268)						6.5E-01	4.3E-07	7.3E-05	1.0E-11	3.6E-01	1.4E-07	1.00	5.7E-07

**Table 16D**  
**RME Risk Calculations - Excavation Worker - Quadrant 3**

Receptor	Parameter	CAS	Tox Surrogate	EPC (mg/kg)	Air EPC (mg/m <sup>3</sup> )	Ingestion		Inhalation		Dermal		Total		
						Hazard	Risk	Hazard	Risk	Hazard	Risk	Hazard	Risk	
<b>Excavation Worker</b>														
	Aluminum	7429905		6312	4.6E-06	2.1E-02		6.6E-04		0E+00		0.022		
	Antimony	7440360		3.236	2.4E-09	2.7E-02				0E+00		0.027		
	Aroclor 1016	12674112		0.0638	4.7E-11	3.1E-03	1.1E-10		4.8E-18	1.3E-03	4.5E-11	0.004		
	Aroclor 1254	11097691		1.047	7.7E-10	1.2E-01	5.0E-08		2.2E-15	7.4E-02	2.1E-08	0.19	7.1E-08	
	Aroclor 1260	11096825		0.21	1.5E-10	2.4E-02	1.0E-08		4.5E-16	1.5E-02	4.2E-09	0.038	1.4E-08	
	Aroclor 1268 - 1016 RFD	11100144	Aroclor1254-1016	0.847	6.2E-10	4.1E-02	4.1E-08		1.8E-15	1.7E-02	1.7E-08	0.058	5.8E-08	
	Aroclor 1268 - 1254 RFD	11100144	Aroclor1254	0.847	6.2E-10	9.5E-02	4.1E-08		1.8E-15	6.0E-02	1.7E-08	0.15	5.8E-08	
	Arsenic, Inorganic	7440382		3.093	2.3E-09	3.5E-02	1.1E-07	1.1E-04	5.0E-14	3.1E-03	1.0E-08	0.038	1.2E-07	
	Benz[a]anthracene	56553		0.239	1.8E-10		4.2E-09		9.8E-17		1.6E-09		5.8E-09	
	Benzene	71432		0.211	5.5E-05	1.8E-04	2.8E-10	1.3E-03	2.2E-12	0E+00	0E+00	0.001	2.8E-10	
	Benzo[a]pyrene	50328		0.222	1.6E-10		3.9E-08		9.1E-16		1.5E-08		5.4E-08	
	Benzo[b]fluoranthene	205992		0.194	1.4E-10		3.4E-09		8.0E-17		1.3E-09		4.7E-09	
	Benzo[k]fluoranthene	207089		0.106	7.8E-11		1.9E-10		4.4E-17		7.2E-11		2.6E-10	
	bis(2-Chloroethyl) ether	111444		0.38	2.8E-10		1.0E-08		4.7E-16		0.0E+00		1.0E-08	
	Carbazole	86748		0.0551	4.1E-11		2.6E-11				7.9E-13		2.7E-11	
	Chromium	18540299		5.132	3.8E-09	5.7E-03	6.2E-08	2.7E-05	1.6E-12	0E+00	0E+00	0.006	6.2E-08	
	Dibenz[a,h]anthracene	53703		0.0807	5.9E-11		1.4E-08		3.6E-16		5.5E-09		2.0E-08	
	Dibromochloromethane	124481		0.125	1.5E-05	2.1E-05	2.5E-10		2.0E-12	6.3E-06	7.6E-11	0.00003	3.3E-10	
	Dichlorobenzene, 1,4-	106467		1.515	1.4E-04	7.3E-05	2.0E-10	1.2E-04	7.6E-12	0E+00	0E+00	0.0002	2.0E-10	
	Ethylbenzene	100414		0.549	9.0E-05	1.8E-05	1.4E-10	6.4E-05	1.1E-12	0E+00	0E+00	0.0001	1.5E-10	
	Indeno[1,2,3-cd]pyrene	193395		0.162	1.2E-10		2.8E-09		6.7E-17		1.1E-09		3.9E-09	
	Iron	7439896		8275	6.1E-06	4.0E-02				0E+00		0.040		
	Mercury, Inorganic Salts	7487947		2.629	1.9E-09	2.9E-02				0E+00		0.029		
	Methylene Chloride	75092		0.461	2.0E-04	2.6E-05	8.3E-11	1.4E-04	4.7E-13	0E+00	0E+00	0.0002	8.3E-11	
	Naphthalene	91203		0.935	1.9E-05	1.6E-04		4.4E-03	3.2E-12	6.1E-05		0.005	3.2E-12	
	Naphthalene, 1-Methyl	90120		3.541	5.6E-05	1.7E-04	2.5E-09			0E+00	0E+00	0.0002	2.5E-09	
	Naphthalene, 2-Methyl	91576		3.104	5.0E-05	2.6E-03				0E+00		0.003		
	4,6-Dinitro-2-methylphenol	534521		8.664	6.4E-09	3.6E-01				1.1E-01		0.47		
	n-Butylbenzene	104518	Ethylbenzene	3.169	5.2E-04	1.1E-04	8.4E-10	3.7E-04	6.6E-12	0E+00	0E+00	0.0005	8.4E-10	
	n-Propylbenzene	103651	Ethylbenzene	1.459	2.4E-04	4.9E-05	3.8E-10	1.7E-04	3.0E-12	0E+00	0E+00	0.0002	3.9E-10	
	Tetrachloroethane, 1,1,2,2-	79345		0.0839	6.2E-11	1.4E-05	4.0E-10		1.8E-17	0E+00	0E+00	0.00001	4.0E-10	
	Trimethylbenzene, 1,2,4-	95636		7.144	8.4E-04			8.5E-02				0.085		
	Vanadium	7440622		39.8	2.9E-08	2.7E-02				0E+00		0.03		
	Total (Low Aroclor-1268)						7.4E-01	3.5E-07	9.3E-02	2.8E-11	2.2E-01	7.7E-08	1.05	4.3E-07
	Total (High Aroclor-1268)						7.9E-01	3.5E-07	9.3E-02	2.8E-11	2.6E-01	7.7E-08	1.14	4.3E-07

**Table 16E**  
RME Risk Calculations - Excavation Worker - Quadrant 4

Receptor	Parameter	CAS	Tox Surrogate	EPC (mg/kg)	Air EPC (mg/m <sup>3</sup> )	Ingestion		Inhalation		Dermal		Total	
						Hazard	Risk	Hazard	Risk	Hazard	Risk	Hazard	Risk
<b>Excavation Worker</b>													
Aluminum	7429905			8475	6.2E-06	2.8E-02		8.9E-04		0E+00		0.029	
Antimony	7440360			7.074	5.2E-09	5.9E-02				0E+00		0.059	
Aroclor 1254	11097691			0.18	1.3E-10	2.0E-02	8.6E-09		3.8E-16	1.3E-02	3.6E-09	0.033	1.2E-08
Aroclor 1260	11096825	See footnote (1)		1.22	9.0E-10	1.4E-01	5.9E-08		2.6E-15	8.6E-02	2.5E-08	0.22	8.3E-08
Aroclor 1268 - 1016 RFD	11100144	Aroclor1254-1016		4.32	3.2E-09	2.1E-01	2.1E-07		9.2E-15	8.7E-02	8.7E-08	0.29	2.9E-07
Aroclor 1268 - 1254 RFD	11100144	Aroclor1254		4.32	3.2E-09	4.8E-01	2.1E-07		9.2E-15	3.0E-01	8.7E-08	0.79	2.9E-07
Arsenic, Inorganic	7440382			2.669	2.0E-09	3.0E-02	9.6E-08	9.3E-05	4.3E-14	2.7E-03	8.6E-09	0.033	1.0E-07
Benz[a]anthracene	56553			0.569	4.2E-10		1.0E-08		2.3E-16			3.9E-09	1.4E-08
Benz[a]pyrene	50328			0.436	3.2E-10		7.6E-08		1.8E-15			3.0E-08	1.1E-07
Benz[b]fluoranthene	205992			0.362	2.7E-10		6.3E-09		1.5E-16			2.5E-09	8.8E-09
Benz[k]fluoranthene	207089			0.184	1.4E-10		3.2E-10		7.6E-17			1.3E-10	4.5E-10
Chloroform	67663			0.0247	8.7E-06	8.3E-06	1.8E-11	6.3E-05	1.0E-12	0E+00	0E+00	0.0001	1.9E-11
Chromium	18540299			16.78	1.2E-08	1.9E-02	2.0E-07	8.8E-05	5.3E-12	0E+00	0E+00	0.019	2.0E-07
Chrysene	218019			0.688	5.1E-10		1.2E-10		2.8E-17			4.7E-11	1.7E-10
Cobalt	7440484			0.543	4.0E-10	6.1E-03		4.7E-05	1.8E-14	0E+00		0.006	1.8E-14
Dibenz[a,h]anthracene	53703			0.254	1.9E-10		4.4E-08		1.1E-15			1.7E-08	6.2E-08
Indeno[1,2,3-cd]pyrene	193395			0.166	1.2E-10		2.9E-09		6.8E-17			1.1E-09	4.0E-09
Iron	7439896			6880	5.1E-06	3.3E-02				0E+00		0.033	
Manganese	7439965			140.6	1.0E-07	3.4E-03		1.5E-03		0E+00		0.005	
Mercury, Inorganic Salts	7487947			8.927	6.6E-09	1.0E-01				0E+00		0.10	
Naphthalene	91203			0.258	5.2E-06	4.3E-05		1.2E-03	8.9E-13	1.7E-05		0.001	8.9E-13
Naphthalene, 1-Methyl	90120			1.513	2.4E-05	7.3E-05	1.1E-09			0E+00	0E+00	0.0001	1.1E-09
n-Butylbenzene	104518	Ethylbenzene		1.996	3.3E-04	6.7E-05	5.3E-10	2.3E-04	4.2E-12	0E+00	0E+00	0.0003	5.3E-10
Tetrachloroethene	127184			0.0283	2.1E-11	9.5E-06	3.7E-10	5.5E-11	6.2E-19	0E+00	0E+00	0.00001	3.7E-10
Trimethylbenzene, 1,2,4-	95636			0.762	8.9E-05			9.1E-03				0.009	
Vanadium	7440622			23.55	1.7E-08	1.6E-02				0E+00		0.016	
Zinc	7440666			1149	8.4E-07	1.3E-02				0E+00		0.013	
Total (Low Aroclor-1268)						6.7E-01	7.1E-07	1.3E-02	1.1E-11	1.9E-01	1.8E-07	0.87	8.9E-07
Total (High Aroclor-1268)						9.5E-01	7.1E-07	1.3E-02	1.1E-11	4.1E-01	1.8E-07	1.37	8.9E-07

**Notes:**

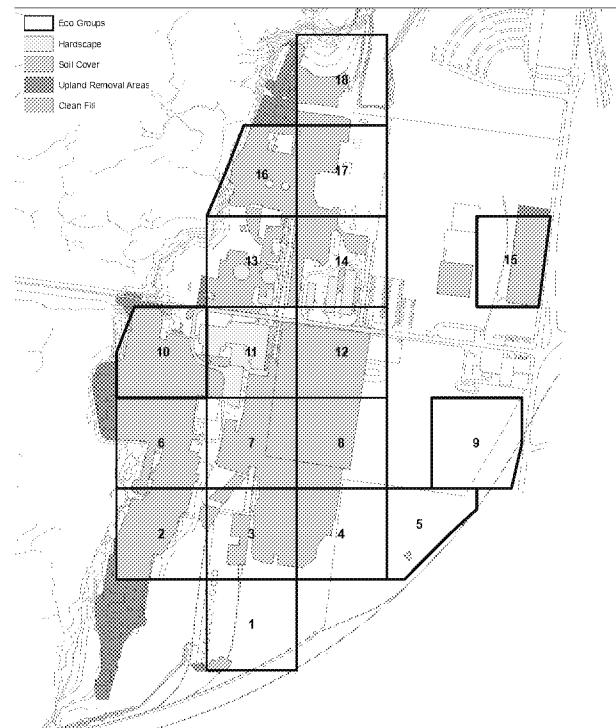
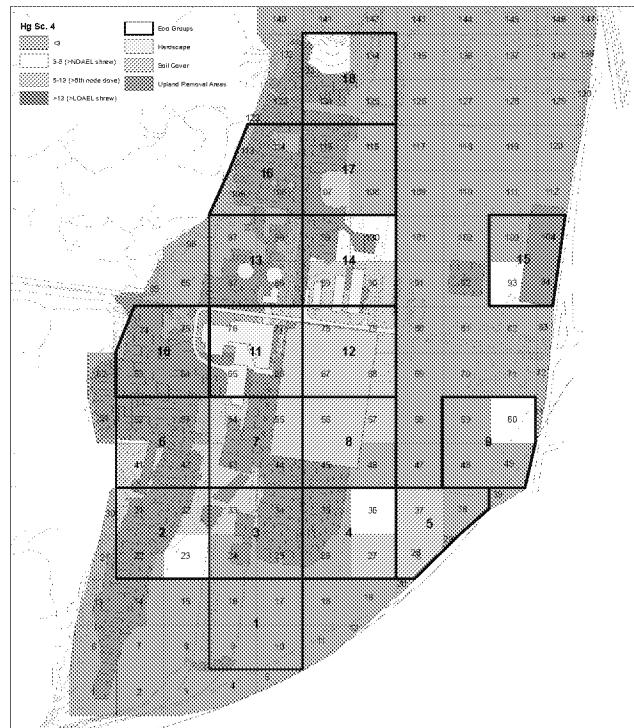
Green highlight indicates those EPC values which were updated from the HHBRA with new sample results

(1) The EPC for Aroclor 1260 was been calculated using 1/2 the detection limit (following ProUCL recommendation)



## APPENDIX C

### Evaluation of Grid Groupings for Ecological Exposure



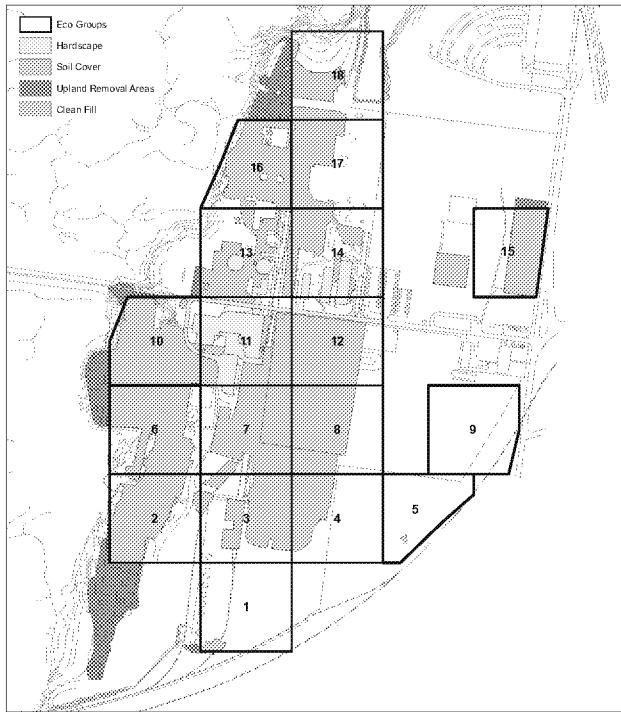
## MERCURY

Group	Grids	Total Hg Adjusted for Backfill (mg/kg)	Total Hg Further Adjusted for Hardscape (mg/kg)
1	9,10,16,17	0.8	0.8
2	22,23,31,32	2	2
3	24,25,33,34	2	2
4	26,27,35,36	3	3
5	28,29,37,38	7	7
6	41,42,52,53	2	2
7	43,44,54,55	2	2
8	45,46,56,57	2	2
9	48,49,59,60	1	1
10	63,64,74,75	1	0.9
11	65,66,76,77	5	2
12	67,68,78,79	5	4
13	87,88,97,98	1	1
14	89,90,99,100	4	3
15	93,94,103,104	7	7
16	105,106,113,114	0.5	0.5
17	107,108,115,116	2	2
18	124,125,133,134	0.6	0.6

Notes:

Exceeds 3 mg/kg (>NOAEL shrew)

Group	Grids	Area (ac)	Clean Fill/Cover (ac)	Hardscape (ac)
1	9,10,16,17	4.00	0.11	0.00
2	22,23,31,32	4.00	2.22	0.00
3	24,25,33,34	4.00	2.15	0.00
4	26,27,35,36	4.00	1.19	0.00
5	28,29,37,38	2.74	0.02	0.00
6	41,42,52,53	4.00	2.80	0.00
7	43,44,54,55	4.00	2.85	0.05
8	45,46,56,57	4.00	2.40	0.00
9	48,49,59,60	3.89	0.00	0.00
10	63,64,74,75	3.81	2.92	0.24
11	65,66,76,77	4.00	1.60	1.72
12	67,68,78,79	4.00	2.35	0.11
13	87,88,97,98	4.00	1.74	0.29
14	89,90,99,100	4.00	1.21	0.70
15	93,94,103,104	3.01	1.52	0.00
16	105,106,113,114	3.16	1.07	0.00
17	107,108,115,116	4.00	0.00	0.00
18	124,125,133,134	3.28	0.00	0.00



Group No.	Area (ac)	Grids	COC
1	4.0	9,10,16,17	Pb
2	4.0	22,23,31,32	Ar1268, Hg
3	4.0	24,25,33,34	Ar1268, Hg
4	4.0	26,27,35,36	Hg
5	2.7	28,29,37,38	Hg
6	4.0	41,42,52,53	Ar1268, Hg
7	4.0	43,44,54,55	Ar1268, Hg
8	4.0	45,46,56,57	Ar1268, Hg
9	3.9	48,49,58,59	Hg
10	3.8	63,64,74,75	Ar1268, Hg
11	4.0	65,66,76,77	Ar1268, Hg, Pb
12	4.0	67,68,78,79	Ar1268, Hg
13	4.0	87,88,97,98	Ar1268
14	4.0	89,90,99,100	Ar1268, Hg
15	3.0	93,94,103,104	Hg
16	3.2	105,106,113,114	Pb
17	4.0	107,108,115,116	Hg, Pb
18	3.3	124,125,133,134	Pb

#### Clean Fill/Soil Cover

FID	Shape *	Area (ac)	Group	Area SUM (ac)
40	Polygon	0.514984	N/A	
43	Polygon	0.110631	1	0.11
25	Polygon	0.066022	2	
26	Polygon	2.123541	2	
27	Polygon	0.022086	2	
28	Polygon	0.009739	2	2.22
13	Polygon	0.109607	3	
21	Polygon	1.556586	3	
23	Polygon	0.395991	3	
24	Polygon	0.090122	3	2.15
20	Polygon	1.192803	4	1.19
22	Polygon	0.018485	5	0.02
29	Polygon	2.802358	6	2.80
12	Polygon	0.090999	7	
14	Polygon	1.949515	7	
18	Polygon	0.805872	7	2.85
15	Polygon	0.52521	8	
19	Polygon	1.875249	8	2.40
32	Polygon	0.026238	10	
34	Polygon	0.026898	10	
35	Polygon	2.8276	10	
36	Polygon	0.009222	10	
37	Polygon	0.031375	10	2.92
9	Polygon	0.066821	11	
10	Polygon	0.094771	11	
11	Polygon	0.37119	11	
16	Polygon	0.654591	11	
30	Polygon	0.010589	11	
31	Polygon	0.083283	11	
33	Polygon	0.090542	11	
38	Polygon	0.223645	11	1.60
7	Polygon	0.009611	12	
8	Polygon	0.006964	12	
17	Polygon	2.328606	12	2.35
0	Polygon	1.531813	13	
4	Polygon	0.199083	13	
2	Polygon	0.013537	13	1.74
3	Polygon	1.096109	14	
5	Polygon	0.064366	14	
6	Polygon	0.047415	14	1.21
39	Polygon	1.377055	15	1.38
41	Polygon	2.217089	16	2.22
1	Polygon	1.524481	17	1.52
42	Polygon	1.074579	18	1.07

#### Hardscape

FID	Shape *	Area (ac)	Group	Area SUM (ac)
19	Polygon	0.047824	7	0.05
5	Polygon	0.09217	10	
6	Polygon	0.076771	10	
7	Polygon	0.056332	10	
8	Polygon	0.011886	10	0.24
4	Polygon	0.902412	11	
9	Polygon	0.184555	11	
16	Polygon	0.024732	11	
18	Polygon	0.327395	11	
22	Polygon	0.022551	11	
23	Polygon	0.257919	11	1.72
1	Polygon	0.010023	12	
3	Polygon	0.026239	12	
13	Polygon	0.044343	12	
17	Polygon	0.032709	12	0.11
14	Polygon	0.080127	13	
15	Polygon	0.004257	13	
20	Polygon	0.103819	13	
21	Polygon	0.100822	13	0.29
0	Polygon	0.090558	14	
2	Polygon	0.144308	14	
10	Polygon	0.029547	14	
11	Polygon	0.217217	14	
12	Polygon	0.214901	14	0.70

**Group 1: Grids 9, 10, 16, 17**

SAMPLE_ID	DATE_SAMPLE	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB
08101-AC-1	4/10/2008	AC-1	soil	861867.625	430726.75	Mercury	0.804	0.0005	0.0005	0.0005	0	0.5	0	0	0 grab	Upland 2008 Sampling Event	0 CAS	
08101-PB-2	4/10/2008	PB-2	soil	861620.875	430809.8125	Mercury	1.22	0.0005	0.0005	0.0005	0	0.5	0	0	0 grab	Upland 2008 Sampling Event	0 CAS	
08102-AC-1-C	4/11/2008	AC-1	soil	861867.625	430726.75	Mercury	1.04	0.0005	0.0005	0.0005	0	0.5	0	0	0 composite	Upland 2008 Sampling Event	0 CAS	
08102-PB-2-C	4/11/2008	PB-2	soil	861620.875	430809.8125	Mercury	0.863	0.0005	0.0005	0.0005	0	0.5	0	0	0 composite	Upland 2008 Sampling Event	0 CAS	
94341-02	12/7/1994	94341-02	soil	861694.0625	430724.9375	Mercury	0	0.05499	0.027495	0.027495	0	1	0	0	0 grab	Proposed Containment Cell Area	0 Eco	
94341-04	12/7/1994	94341-04	soil	861731.0625	430932.9375	Mercury	0	0.057	0.0285	0.0285	0	1	0	0	0 grab	Proposed Containment Cell Area	0 Eco	
94341-06	12/7/1994	94341-06	soil	861748.0625	431038.9375	Mercury	0	0.059	0.0295	0.0295	0	1	0	0	0 grab	Proposed Containment Cell Area	0 Eco	
94342-12	12/8/1994	94342-12	soil	861767.0625	430813.9375	Mercury	0	0.05499	0.027395	0.027395	0	1	0	0	0 grab	Proposed Containment Cell Area	0 Eco	
94342-15	12/8/1994	94342-15	soil	861836.0625	430927.9375	Mercury	0	0.056	0.0285	0.0285	0	1	0	0	0 grab	Proposed Containment Cell Area	0 Eco	
94342-17	12/8/1994	94342-17	soil	861852.0625	431018.9375	Mercury	0	0.059	0.0295	0.0295	0	1	0	0	0 grab	Proposed Containment Cell Area	0 Eco	
94343-06	12/9/1994	94343-06	soil	861869.0625	430798.9375	Mercury	0	0.056	0.0285	0.0285	0	1	0	0	0 grab	Proposed Containment Cell Area	0 Eco	
94343-08	12/9/1994	94343-08	soil	861947.0625	430994.9375	Mercury	0	0.054	0.0275	0.0275	0	1	0	0	0 grab	Proposed Containment Cell Area	0 Eco	
94344-01	12/10/1994	94344-01	soil	861788.0625	430720.9375	Mercury	0	0.056	0.0285	0.0285	0	1	0	0	0 grab	Proposed Containment Cell Area	0 Eco	
94344-03	12/10/1994	94344-03	soil	861879.0625	430722.9375	Mercury	0	0.052	0.0285	0.0285	0	1	0	0	0 grab	Proposed Containment Cell Area	0 Eco	
94344-05	12/10/1994	94344-05	soil	861970.0625	430773.9375	Mercury	0	0.056	0.0285	0.0285	0	1	0	0	0 grab	Proposed Containment Cell Area	0 Eco	
94344-07	12/10/1994	94344-07	soil	861937.0625	430914.9375	Mercury	0	0.054	0.0275	0.0275	0	1	0	0	0 grab	Proposed Containment Cell Area	0 Eco	
950039-15	2/8/1995	950039-15	soil	861765.0625	431051.9375	Mercury	0	0.28799	0.143995	0.143995	0	1	0	0	0 grab	Proposed Containment Cell Area	0 Eco	
950235-OST-31	8/23/1995	OST-31	soil	861606.0625	430883.9375	Mercury	0	0.10999	0.054995	0.054995	0	1	0	0	0 grab	W. Side OST Area	0 Pac	
96255-21	9/11/1996	96255-21	soil	861679.0625	431048.9375	Mercury	0	0.6	0.3	0.3	0	1	0	0	0 grab	tan sand with traces of rust material	0 QAL	
96255-23	9/11/1996	96255-23	soil	861679.0625	430948.9375	Mercury	0	0.54	0.27	0.27	0	1	0	0	0 grab	brown sand with some root mass	0 QAL	
97140-04	5/20/1997	97140-04	soil	861711.0625	430672.9375	Mercury	0.89999	0.51999	0.89999	0.89999	J%	R	0	0.1	0	0 comp	limestone road surface sample 5-pt	0 QAL
97140-05	5/20/1997	97140-05	soil	861742.0625	431013.9375	Mercury	1.98	0.50999	0.25	0.25	J%	R	0	0.1	0	0 comp	limestone road surface sample 5-pt	0 QAL
98064-BMA-01	3/5/1998	98064-BMA-01	soil	861956.0625	431070.9375	Mercury	1.12	0.57999	0.3	0.3	0	1	1	0	0 comp	brine mud stockpile area	0 QAL	
98064-BMA-02	3/5/1998	98064-BMA-02	soil	861951.0625	431028.9375	Mercury	0	0.56999	0.289995	0.289995	0	1	1	0	0 comp	brine mud stockpile area	0 QAL	
98064-BMA-06	3/5/1998	98064-BMA-06	soil	861898.0625	431035.9375	Mercury	0.82999	0.57999	0.229995	0.229995	0	1	1	0	0 comp	brine mud stockpile area	0 QAL	
98064-BMA-07	3/5/1998	98064-BMA-07	soil	861821.0625	430963.9375	Mercury	0	0.58999	0.299995	0.299995	0	1	1	0	0 comp	brine mud stockpile area	0 QAL	
98071-BMA-10	3/12/1998	98071-BMA-10	soil	861842.0625	431047.9375	Mercury	1.09	0.67	0.35	0.35	0	1	1	0	0 comp	brine mud stockpile area	0 QAL	
98071-BMA-11	3/12/1998	98071-BMA-11	soil	861836.0625	431003.9375	Mercury	0	0.62999	0.31	0.31	0	1	1	0	0 comp	brine mud stockpile area	0 QAL	
98075-BMA-12	3/16/1998	98075-BMA-12	soil	861806.0625	431053.9375	Mercury	9.57	0.56	0.57	0.57	0	0	1	0	0 comp	brine mud stockpile area	0 QAL	
98279-BMA-13	10/6/1998	98279-BMA-13	soil	861778.0625	431043.9375	Mercury	1.6	0.56	0.57	0.57	J%	R	0	0.3	1	0 comp	brine mud stockpile area	0 QAL
LC-634-SLA	12/1/1994	LC-634	soil	861639.0625	431026.9375	Mercury	3.1	0	0	0	3.1	0	1	0	0 comp		0 ESD	
LC-635-SLA	12/1/1994	LC-635	soil	861622.0625	430806.9375	Mercury	0.63999	0	0	0	0.63999	0	1	0	0 comp		0 ESD	

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
0.84	0.57	4.00	0.11	0.00	2.8%	97.2%	0.82

**Group 2: Grids 22, 23, 31, 32**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
09129-SL3-0-2	5/9/2009 SL-3	soil	861565.625	431287.3125	Mercury	1.25	0.0005	1.25	0	2	0	0	grab	Phase IIIC Characterization samples	May 2009 Upland Soil Sampling	0	CAS	
96214-01	8/1/1996 96214-01	soil	861529.0625	431248.9375	Mercury	1.58	0.52999	1.58	0	1	0	0	grab	Phase IIIC Characterization samples		0	QAL	
96214-03	8/1/1996 96214-03	soil	861429.0625	431148.9375	Mercury	0.46	0.51999	0.46	0	1	0	0	grab	Phase IIIC Characterization samples		0	QAL	
96214-05	8/1/1996 96214-05	soil	861529.0625	431148.9375	Mercury	1.21	0.54	1.21	0	1	0	0	grab	Phase IIIC Characterization samples		0	QAL	
97086-SRA-102	3/27/1997 97086-SRA-102	soil	861263.25	431447.4375	Mercury	18.3	0.57999	18.3	0	2	2	0	comp	post excavation 3-pt N sidewall		0	QAL	
97097-SRA-121	4/7/1997 97097-SRA-121	soil	861185.25	431344.3438	Mercury	3.03	0.55	3.03	0	1	2	0	comp	post excavation 3-pt W sidewall		0	QAL	
97107-BM4-19	4/17/1997 97107-BM4-19	soil	861489.75	431419.8438	Mercury	6.54	0.56999	6.54	0	1.5	2	0	comp	post excavation E sidewall 3-pt		0	QAL	
97125-BM3-09	5/5/1997 97125-BM3-09	soil	861395.5625	431268.3438	Mercury	11.9	0.50999	11.9	0.5	0.5	1	0	comp	post excavation 5-pt bottom		0	QAL	
97135-03	5/15/1997 97135-03	soil	861536.0625	431413.9375	Mercury	4.52	0.51999	4.52	0	0.1	0	0	comp	road surface sample 5-pt		0	QAL	
97135-04	5/15/1997 97135-04	soil	861484.0625	431287.9375	Mercury	2.26	0.51999	2.26	0	0.1	0	0	comp	road surface sample 5-pt		0	QAL	

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	Backfill/Soil Grid Cell Area (ac)	Incomplete Cover Area (ac)	Ecological Hardscape (ac)	Portion of Exposure Area (ac)	Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
5.1	0.57	4.00	2.22	0.00	55.5%	44.5%	2.4

**Group 3: Grids 24, 25, 33, 34**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
08101-AC-2	4/10/2008	AC-2	soil	861641.75	431449.75	Mercury	0.609	0.0005	0.509		0	0.5	0	0	0 grab	Upland 2008 Sampling Event	0	CAS	
08102-AC-2-C	4/11/2008	AC-2	soil	861641.75	431449.75	Mercury	0.265	0.0005	0.265		0	0.5	0	0	0 composite	Upland 2008 Sampling Event	0	CAS	
94208-10	7/27/1994	94208-10	soil	861771.0625	431179.9375	Mercury	37.3	3.02	37.3		0	1	0	0	0 comp	2nd most S		0	Eco
94341-08	12/7/1994	94341-08	soil	861776.0625	431138.9375	Mercury	0	0.059	0.059	U	0	1	0	0	0 grab	Proposed Containment Cell Area		0	Eco
94342-19	12/8/1994	94342-19	soil	861865.0625	431119.9375	Mercury	7.04	0.307	7.04		0	1	0	0	0 grab	Proposed Containment Cell Area		0	Eco
94343-11	12/9/1994	94343-11	soil	861970.0625	431100.9375	Mercury	0	0.063	0.063	U	0	1	0	0	0 grab	Proposed Containment Cell Area		0	Eco
96169-M50	6/17/1996	96169-M50	soil	861990.25	431163.125	Mercury	0.69999	0.54	0.69999		0.5	1	1	0	0 comp	post excavation bottom 5-pt		0	QAL
96256-01	9/12/1996	96256-01	soil	861629.0625	431148.9375	Mercury	0	0.58999	0.58999	U	0	1	0	0	0 grab	tan sand with trace amount of roots		0	QAL
96256-03	9/12/1996	96256-03	soil	861629.0625	431248.9375	Mercury	0.73	0.56	0.73		0	1	0	0	0 grab	brown to tan sand		0	QAL
97121-OST-18	5/1/1997	97121-OST-18	soil	861885.0625	431146.9375	Mercury	3.81	0.56999	3.81		0	1.5	2	0	0 comp	post excavation S sidewall 3-pt		0	QAL
97121-OST-19	5/1/1997	97121-OST-19	soil	861674.0625	431190.9375	Mercury	0.98	0.54	0.98		0	1.5	2	0	0 comp	post excavation W sidewall 3-pt		0	QAL
97121-OST-21	5/1/1997	97121-OST-21	soil	861693.0625	431237.9375	Mercury	4.12	0.56999	4.12		0	1.5	2	0	0 comp	post excavation N sidewall 3-pt		0	QAL
97122-OST-26	5/2/1997	97122-OST-26	soil	861703.0625	431277.9375	Mercury	3.41	0.56999	3.41		0	1.5	2	0	0 comp	post excavation S sidewall 3-pt		0	QAL
97122-OST-27	5/2/1997	97122-OST-27	soil	861691.0625	431325.9375	Mercury	1	0.55	1		0	1.25	2	0	0 comp	post excavation W sidewall 3-pt		0	QAL
97122-OST-29	5/2/1997	97122-OST-29	soil	861721.1875	431382.25	Mercury	3.47	0.56999	3.47		0	1.5	2	0	0 comp	post excavation N sidewall 3-pt		0	QAL
97170-M108	6/19/1997	97170-M108	soil	861821.0625	431365.9375	Mercury	7.1	0.1	7.1		0	1.5	2	0	0 comp	Post excavation South sidewall 3-point		0	Sav
98064-BMA-04	3/5/1998	98064-BMA-04	soil	861914.0625	431123.9375	Mercury	2.84	0.58999	2.84		0.5	1	1	0	0 comp	brine mud stockpile area		0	QAL
98064-BMA-05	3/5/1998	98064-BMA-05	soil	861906.0625	431081.9375	Mercury	4.08	0.56999	4.08		0.5	1	1	0	0 comp	brine mud stockpile area		0	QAL
98071-BMA-08	3/12/1998	98071-BMA-08	soil	861859.0625	431131.9375	Mercury	4.54	0.62	4.54		0.5	1	1	0	0 comp	brine mud stockpile area		0	QAL
98071-BMA-09	3/12/1998	98071-BMA-09	soil	861852.0625	431091.9375	Mercury	0	0.83999	0.83999	U	0.5	1	1	0	0 comp	brine mud stockpile area		0	QAL

Avg. Hg Concentration	Most Common Detection Limit	Grid Cell Area	Backfill/Soil Cover Area	Portion of Hardscape	Incomplete Exposure Area	Ecological Exposure Area	Weighted Avg. Hg Concentration
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	(ac)	{ppm}
4.1	0.57	4.00	2.15	0.00	53.8%	46.3%	2.1

**Group 4: 26, 27, 35, 36**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	Result_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB
08101-HG-2	4/10/2008	HG-2	soil	862001.1875	431132.6875	Mercury	0.0724	0.0005	0.0362	U	0	0.5	0	0	0 grab		Upland 2008 Sampling Event	0 CAS
08102-HG-2-C	4/11/2008	HG-2	soil	862001.1875	431132.6875	Mercury	0.576	0.0005	0.573	U	0	0.5	0	0	0 composite		Upland 2008 Sampling Event	0 CAS
94344-14	12/10/1994	94344-14	soil	862025.5625	431089.3438	Mercury	0	0.05499	0.027495	U	0	1	0	0	0 grab	Proposed Containment Cell Area		0 Eco
LC-621-SLA	12/1/1994	LC-621	soil	862323.0625	431375.9375	Mercury	3.6	0	0	U	0	1	0	0	0 comp			0 ESD
LC-622-SLA	12/1/1994	LC-622	soil	862296.0625	431111.9375	Mercury	13	0	0	U	0	1	0	0	0 comp			0 ESD

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
3.5	0.57	4.00	1.19	0.00	29.8%	70.2%	2.5

**Group 5: 28, 29, 37, 38**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT	0.5DL_R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
96331-RI-13	11/27/1996	96331-RI-13	soil	862813.563	431491.4063	Mercury	1.31	0.56	1.31	0	1	0	0	0	comp/grab	brown & gray loamy sand	0	QAL	
97044-07	2/13/1997	97044-07	soil	862502.063	431176.9063	Mercury	17.5	0.54	17.5	0	1	0	0	0	grab	delineation sample	0	QAL	
97044-09	2/13/1997	97044-09	soil	862525.063	431197.9063	Mercury	3.67	0.55	3.67	0	1	0	0	0	grab	delineation sample	0	QAL	
97049-03	2/18/1997	97049-03	soil	862495.063	431187.9063	Mercury	5.3	0.55	5.3	0	1	0	0	0	grab	delineation samples	0	QAL	
LC-620-SLA	12/1/1994	LC-620	soil	862546.063	431308.9063	Mercury	6	0	6	0	1	0	0	0	comp		0	ESD	

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
6.8	0.57	2.74	0.02	0.00	0.7%	99.3%	6.7

**Group 6: 41, 42, 52, 53**

SAMPLE_ID	DATE_SAMPLE	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
09129-SL13-0-2	5/9/2009 SL-13		soil	861561.25	431791.0313	Mercury	0.234	0.0002	0.234		0	2	0	0	0 grab		May 2009 Upl	0 CAS	
09130-SL9-0-2	5/10/2009 SL-9		soil	861241.375	431584.8125	Mercury	0.155	0.0002	0.155		0	2	0	0	0 grab		May 2009 Upl	0 CAS	
94196-08	7/15/1994 94196-08		soil	861448.0625	431681.9375	Mercury	16.9	3.02	38.5		0	1	0	0	0 comp	W area		0 Eco	
97104-02	4/14/1997 97104-02		soil	861347.0625	431614.9375	Mercury	4.8	0.56999	5.8		0	0.1	0	0	0 comp	area of drum sump W BMI		0 QAL	
97111-BM4-26	4/21/1997 97111-BM4-26		soil	861524.5625	431565.4375	Mercury	3.1	0.56	5.1		0	2	2	0	0 comp	post excavation E sidewall		0 QAL	
97114-BM4-31	4/24/1997 97114-BM4-31		soil	861514	431621.8438	Mercury	2.02	0.57999	2.92		0.1	0.1	1	0	0 comp	post excavation bottom 5-		0 QAL	
98156-MED-40	6/5/1998 98156-MED-40		soil	861195.5	431621.6563	Mercury	20.2	0.55	20.2		0	1	0	2	2 grab	marsh exc. east delineation		0 QAL	
98156-MED-41	6/5/1998 98156-MED-40		soil	861195.5	431621.6563	Mercury	16.4	0.55	16.4		0	1	0	2	2 grab	dup of 98156-med-40		0 QAL	
98156-MED-43	6/5/1998 98156-MED-43		soil	861200.3125	431661.6563	Mercury	0	0.54	0.54	U	0	1	0	2	2 grab	marsh exc. east delineation		0 QAL	
98156-MED-45	6/5/1998 98156-MED-45		soil	861253.0625	431617.9375	Mercury	0	0.56999	0.56999	U	0	1	0	2	2 grab	marsh exc. east delineation		0 QAL	
99153-LRC-03	6/2/1999 99153-LRC-03		soil	861516.0625	431683.9375	Mercury	0	0.25	0.25	U	0	0.2	1	0	0 comp	limerock road confirmation		0 Kem	
99153-LRC-04	6/2/1999 99153-LRC-04		soil	861356.0625	431771.9375	Mercury	7.8	2.6	7.8		0	0.2	1	0	0 comp	limerock road confirmation		0 Kem	
99159-USC-17	6/8/1999 99159-USC-17		soil	861236.0625	431903.9375	Mercury	0.98	0.25999	0.98		0	0.2	1	0	0 comp	upland soil confirmational		0 Kem	

Avg. Hg Concentration	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
5.6	0.57	4.00	2.80	0.00	70.0%	30.0%	1.9

**Group 7: 43, 44, 54, 55**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0SDL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB
94196-04	7/15/1994	94196-04	soil	861605.0625	431649.9375	Mercury	9.54	0.12099	3.14	0	1	0	0 comp	NW area		0 Eco		
94196-05	7/15/1994	94196-05	soil	861641.0625	431505.9375	Mercury	13	3.02	3.3	0	1	0	0 comp	SE area		0 Eco		
96261-01	9/17/1996	96261-01	soil	861788.0625	431612.9375	Mercury	0	0.57999	0.289995	U	0	1	0	0 grab	dark brown sand with blac		0 QAL	
96298-SRY-24	10/24/1996	96298-SRY-24	soil	861827.875	431864.625	Mercury	2.68	0.58999	2.58	0	2	2	0 comp	post excavation east sidew		0 QAL		
97086-CTA-03	3/27/1997	97086-CTA-03	soil	861740.0625	431718.9375	Mercury	7.78	0.6	7.78	0	2	2	0 comp	post excavation 3-pt S side		0 QAL		
97135-02	5/15/1997	97135-02	soil	861576.0625	431553.9375	Mercury	2.36	0.52999	2.36	0	0.1	0	0 comp	road surface sample 5-pt		0 QAL		

*Including Harscape*

Avg. Hg Concentration	Most Common Detection Limit	Grid Cell Area	Backfill/Soil Cover Area (ac)	Portion of Hardscape	Incomplete Exposure Area	Ecological Exposure Area	Weighted Avg. Hg Concentration
(ppm)	(ppm)	(ac)	Cover Area (ac)	(ac)	(ac)	(ac)	(ppm)
5.9	0.57	4.00	2.85	0.05	72.5%	27.5%	1.8

*Excluding Harscape*

Avg. Hg Concentration	Most Common Detection Limit	Grid Cell Area	Backfill/Soil Cover Area (ac)	Portion of Hardscape	Incomplete Exposure Area	Ecological Exposure Area	Weighted Avg. Hg Concentration
(ppm)	(ppm)	(ac)	Cover Area (ac)	(ac)	(ac)	(ac)	(ppm)
5.9	0.57	4.00	2.85	0.00	71.3%	28.8%	1.9

**Group 8: 45, 46, 56, 57**

SAMPLE_ID	DATE_SAMPLE	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.50%	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB
09129-SL21-0-2	5/9/2009	SL-21	soil	862315.8125	431633.3438	Mercury	1.15	0.0005	1.31	0	2	0	0	0 grab		May 2009 Upland Soil Sampling	0 CAS	
97042-03	2/11/1997	97042-03	soil	862302.0625	431865.9063	Mercury	9.3	0.56999	8.81	0	1	0	0	0 grab	characterization east of cell buildings		0 QAL	
97042-06	2/11/1997	97042-06	soil	862286.0625	431767.9375	Mercury	6.2	0.58999	6.21	0	1	0	0	0 grab	characterization east of cell buildings		0 QAL	
<hr/>																		
Avg. Hg Concentration	Most Common Detection Limit	Grid Cell Area	Backfill/Soil Cover Area	Portion of Hardscape	Incomplete Exposure Area	Ecological Exposure Area	Weighted Avg. Hg Concentration											
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	(ac)	(ppm)											
5.6	0.57	4.00	2.40	0.00	60.0%	40.0%	2.4											

**Group 9: Grids 48, 49, 48, 59, 60**

SAMPLE_ID	DATE	SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	Result_0.5DL	R_MOD	D1	D2	POS	REMOVE	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB
96331-RI-11		11/27/1996	96331-RI-11	soil	862938.563	431616.4063	Mercury	0.75999	0.6	0.379995		0	1	0	0	comp/grab	brown & gray loamy sand	O QAL	
LC-616-SLA		12/1/1994	LC-616	soil	862954.063	431887.9063	Mercury	3.3	0	0		0	1	0	0	comp		O ESD	
LC-617-SLA		12/1/1994	LC-617	soil	862698.063	431750.9063	Mercury	0	0.11999	0.059995	U	0	1	0	0	comp		O ESD	
<hr/>																			
Avg. Hg Concentration	Most Common Detection Limit	Backfill/Soil Grid Cell Area	Portion of Cover Area	Incomplete Hardscape	Ecological Exposure Area	Weighted Avg. Hg Concentration													
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	{ppm}													
1.4	0.57	3.89	0.00	0.00	0.0%	100.0%													

**Group 10: Grids 63, 64, 74, 75**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_SD	R_MOD	D1	D2	POS_Removed	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB
09129-SL24-0-2	5/9/2009	SL-24	soil	861395.625	432256.375	Mercury	0.0769	0.0002	0.049	3.26	0	2	0	0 grab	May 2009 Upland Soil Sampling	0 CAS	
96260-19	9/16/1996	96260-19	soil	861535.125	432233.9375	Mercury	3.26	0.56999	3.28	0	1	0	0 grab	brown to tan sand	0 QAL		
96283-CPS-01	10/9/1996	96283-CPS-01	soil	861568.0625	432097.9375	Mercury	9.97	0.63999	9.93	0.5	1	1	0 comp	post excavation, 5-pt composite	0 QAL		
96290-CPS-07	10/16/1996	96290-CPS-07	soil	861537.0625	432109.9375	Mercury	9.01	0.58999	9.02	0.5	1	1	0 comp	post excavation (bottom), 3-pt composite	0 QAL		
96290-CPS-08	10/16/1996	96290-CPS-08	soil	861543.0625	432117.9375	Mercury	9.48	0.6	9.48	0	0.8	2	0 comp	post excavation (n. sidewall), 3-pt composite	0 QAL		
99074-USC-15	3/15/1999	99074-usc-15	soil	861348.125	432121.9375	Mercury	0	0.25999	0.25999	0	0	1	0 comp	area under OHM pool #2	0 Kem		
99074-USC-16	3/15/1999	99074-usc-16	soil	861366.125	432194.4375	Mercury	0	0.27	0.27	0	0	1	0 comp	area under OHM pool #3	0 Kem		
99159-LRC-05	6/8/1999	99159-LRC-05	soil	861336.125	432253.9375	Mercury	0.27	0.25999	0.27	0	0.2	1	0 comp	limerock road confirmational	0 Kem		
99159-USC-18	6/8/1999	99159-USC-18	soil	861236.0625	432003.9375	Mercury	0.68	0.25999	0.68	0	0.2	1	0 comp	upland soil confirmational E. WPA	0 Kem		

*Including Hardscape*

Avg. Hg Concentration	Most Common Detection Limit	Grid Cell Area	Backfill/Soil Cover Area	Portion of Hardscape	Incomplete Exposure Area	Ecological Exposure Area	Weighted Avg. Hg Concentration
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	(ac)	(ppm)
3.7	0.57	3.81	2.92	0.24	82.9%	17.1%	0.86

*Excluding Hardscape*

Avg. Hg Concentration	Most Common Detection Limit	Grid Cell Area	Backfill/Soil Cover Area	Portion of Hardscape	Incomplete Exposure Area	Ecological Exposure Area	Weighted Avg. Hg Concentration
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	(ac)	(ppm)
3.7	0.57	3.81	2.92	0.00	76.6%	23.4%	1.1

**Group 11: Grids 65, 66, 76, 77**

SAMPLE_ID	DATE_SAMPLE	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
94208-06	7/27/1994	94208-06	soil	861937.125	432303.9375	Mercury	12.1	0.30199	12.1	1.69	0	1	0	0	comp	just N of E-W road	0	Eco	
96247-16	9/3/1996	96247-16	soil	861969.125	432326.9375	Mercury	1.69	0.54	1.69	0.6	0	1	0	0	grab	light brown to grey sand	0	QAL	
96261-CSA-01	9/17/1996	96261-CSA-0	soil	861799.5	432003.25	Mercury	4.28	0.6	4.28	0.6	0.5	0.5	1	0	comp	post excavation, 4-pt composite from sump	0	QAL	
96262-CSA-02	9/18/1996	96262-CSA-0	soil	861791.0625	431957.9375	Mercury	14.6	0.6	14.6	14.6	0.5	0.8	1	0	comp	post excavation, 5-pt composite, grey/brown s	0	QAL	
96270-SRY-09	9/26/1996	96270-SRY-0:	soil	861868.6875	431973.0625	Mercury	19.6	0.58999	19.6	19.6	0	1.5	1	0	comp	post excavation bottom 5-pt	0	QAL	
96284-CPS-02	10/10/1996	96284-CPS-0	soil	861612.0625	432088.9375	Mercury	13.5	0.58999	13.5	13.5	0.5	1	1	0	comp	post excavation (bottom), 5-pt composite, brc	0	QAL	
96317-SRY-40	11/12/1996	96317-SRY-4:	soil	861885.5625	432246.125	Mercury	9.17	0.56999	9.17	9.17	0	1.3	2	0	comp	post excavation 3-pt north sidewall	0	QAL	
GPT-00-1	3/23/1995	GPT-00	soil	861938.125	432297.625	Mercury	3.2	0	3.2	0	0	2	0	0	grab		0	Sav	
GPT-01-1	3/23/1995	GPT-01	soil	861913.25	432300.8438	Mercury	9.2	0	9.2	0	0	2	0	0	grab		0	Sav	
GPT-02-1	3/23/1995	GPT-02	soil	861884.25	432305.4063	Mercury	1.2	0	1.2	0	0	2	0	0	grab		0	Sav	

*Including Hardscape*

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
8.9	0.57	4.00	1.60	1.72	83.0%	17.0%	1.7

*Excluding Hardscape*

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
8.9	0.57	4.00	1.60	0.00	40.0%	60.0%	5.4

**Group 12: Grids 67, 68, 78, 79**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_05DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
97034-01	2/3/1997	97034-01	soil	862228.125	432283.9375	Mercury	3.82	0.58999	1.91		0	1	0	0	grab	characterization south side boiler house	0 QAL		
97034-03	2/3/1997	97034-03	soil	862164.125	432283.9375	Mercury	10.4	0.6	3.14		0	1	0	0	grab	characterization south side boiler house	0 QAL		
97034-05	2/3/1997	97034-05	soil	862112.125	432333.9375	Mercury	9.92	0.57999	3.57		0	1	0	0	grab	characterization west side boiler house	0 QAL		
97036-01	2/5/1997	97036-01	soil	862266.125	432329.9063	Mercury	17.2	0.58999	7.12		0	1	0	0	grab	characterization east side boiler house	0 QAL		
97042-01	2/11/1997	97042-01	soil	862318.0625	431967.9063	Mercury	11.8	0.56	4.18		0	1	0	0	grab	characterization east of cell buildings	0 QAL		

*Including Hardscape*

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
10.6	0.57	4.00	2.35	0.11	61.5%	38.5%	4.3

*Excluding Hardscape*

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
10.6	0.57	4.00	2.35	0.00	58.8%	41.3%	4.3

## Group 13: 87, 88, 97, 98

SAMPLE_ID	DATE_SAMPLE	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	DX	DX	POS	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	
09129-SL26-0-2	5/9/2009 SL-26	soil	861897.75	432398.0313	Mercury	0.0394	0.0002:	0.0196	0	2	0	0	grab	3rd N most		May 2009 Upland Soil Sampling	0	CAS		
94208-05	7/27/1994 94208-05	soil	861965.125	432510.9375	Mercury	17.4	0.30199:	5.21	0	1	0	0	grab	hand auger boring samples south of north removal area		0 Eco				
96207-01	7/25/1996 96207-01	soil	861741.125	432749.8375	Mercury	8.91	0.61:	5.82	0	1	0	0	grab	hand auger boring samples south of north removal area		0 OAL				
96207-04	7/25/1996 96207-04	soil	861741.125	432675.9375	Mercury	0	0.6:	5.21	U	0	1	0	0	grab	hand auger boring samples south of north removal area		0 OAL			
96207-06	7/25/1996 96207-06	soil	861691.125	432649.8375	Mercury	12.6	0.63999:	3.82	U	0	1	0	0	grab	hand auger boring samples south of north removal area		0 OAL			
96207-07	7/25/1996 96207-07	soil	861691.125	432698.9375	Mercury	0.34999	0.79:	0.33829:	U	0	1	0	0	grab	hand auger boring samples south of north removal area		0 OAL			
96207-09	7/25/1996 96207-09	soil	861691.125	432748.9375	Mercury	0.37	0.6:	0.31	U	0	1	0	0	grab	hand auger boring samples south of north removal area		0 OAL			
96207-10	7/25/1996 96207-10	soil	861649.125	432748.9375	Mercury	0.52999	0.68999:	0.33829:	U	0	1	0	0	grab	hand auger boring samples south of north removal area		0 OAL			
96227-01	8/14/1996 96227-01	soil	861906.125	432579.9375	Mercury	1.72	0.55:	0.78	U	0	1	0	0	grab	brown to light gray sand		0 OAL			
96227-03	8/14/1996 96227-03	soil	861891.125	432583.9375	Mercury	4.27	0.54:	5.27	U	0	1	0	0	grab	brown sand		0 OAL			
96239-01	8/26/1996 96239-01	soil	861819.125	432583.9375	Mercury	0.74	0.51999:	0.78	U	0	1	0	0	grab	tan sand		0 OAL			
96239-04	8/26/1996 96239-04	soil	861784.125	432583.9375	Mercury	0.66	0.52999:	0.68	U	0	1	0	0	grab	tan sand		0 OAL			
96239-07	8/26/1996 96239-07	soil	861762.125	432595.9375	Mercury	0.50999	0.54:	0.57989:	U	0	1	0	0	grab	tan sand		0 OAL			
96239-09	8/26/1996 96239-09	soil	861800.125	432632.9375	Mercury	11	0.52999:	3.1	U	0	1	0	0	grab	tan, trace brown sand		0 OAL			
96239-14	8/26/1996 96239-14	soil	861742.125	432713.9375	Mercury	0.67	0.57999:	0.62	U	0	1	0	0	grab	tan sand		0 OAL			
96239-15	8/26/1996 96239-15	soil	861759.125	432713.9375	Mercury	0	0.54:	0.52	U	0	1	0	0	grab	tan sand		0 OAL			
96247-NRA-101	9/3/1996 96247-NRA-101	soil	861754.0625	432697.9375	Mercury	0	0.54:	0.52	U	0	1	2	0	comp	post excavation, 3-pt composite, brown/grey sand, e. sidewall		0 OAL			
96247-NRA-102	9/3/1996 96247-NRA-102	soil	861745.875	432683.4063	Mercury	0.92	0.54:	0.62	U	0	1	2	0	comp	post excavation, 3-pt composite, brown/grey sand, s. sidewall		0 OAL			
96248-10	9/4/1996 96248-10	soil	861754.125	432670.9375	Mercury	0.8	0.56:	0.68	U	0	1	0	0	grab	dark brown sand with loamy material		0 OAL			
96254-NWF-01	9/10/1996 96254-NWF-01	soil	861745.0625	432390.1563	Mercury	0	0.57999:	0.57989:	U	0.5	1	3	1	0	comp	post excavation, 5-pt composite, brown sand with some black stained sand, hydrocarbon odor, bottom		0 OAL		
96254-NWF-02	9/10/1996 96254-NWF-02	soil	861751.125	432440.9375	Mercury	2.79	0.55:	0.75	U	0.5	1	1	0	comp	post excavation, 5-pt composite, brown and orange sand, bottom		0 OAL			
96255-NWF-03	9/11/1996 96255-NWF-03	soil	861744.9375	432338.125	Mercury	0	0.58999:	0.28989:	U	0.5	0.8	1	0	grab	post excavation, 5-pt composite, brown sand, bottom		0 OAL			
96256-NWF-04	9/12/1996 96256-NWF-04	soil	861696.3125	432439.5625	Mercury	0.62999	0.56:	0.52989:	U	0.5	0.8	1	0	comp	post excavation, 5-pt composite, brown sand, bottom		0 OAL			
96256-NWF-05	9/12/1996 96256-NWF-05	soil	861700.125	432360.9375	Mercury	0	0.56999:	0.28989:	U	0.5	0.8	1	0	comp	post excavation, 5-pt composite, brown sand, bottom		0 OAL			
96260-NWF-06	9/16/1996 96260-NWF-06	soil	861637.5	432349.1563	Mercury	0.50999	0.62999:	0.32989:	U	0.5	0.8	1	0	comp	post excavation, 5-pt composite, brown sand, bottom		0 OAL			
96260-NWF-07	9/16/1996 96260-NWF-07	soil	861648	432389.5653	Mercury	0	0.56:	0.28	U	0	0.8	1	0	comp	post excavation, 5-pt composite, brown sand, bottom		0 OAL			
96262-NWF-09	9/19/1996 96262-NWF-09	soil	861594.8125	432437.7813	Mercury	0	0.56:	0.28	U	0.5	1	1	0	comp	post excavation, 5-pt composite, brown sand, bottom		0 OAL			
96262-NWF-11	9/19/1996 96262-NWF-11	soil	861602.125	432466.9375	Mercury	2.09	0.55:	0.75	U	0	1	2	0	comp	post excavation, 3-pt composite, brown sand, n. sidewall		0 OAL			
96263-NWF-16	9/19/1996 96263-NWF-16	soil	861664.3125	432503.5938	Mercury	0	0.57999:	0.32898:	U	0.5	0.8	1	0	comp	post excavation, 5-pt composite, brown sand, bottom		0 OAL			
96263-NWF-18	9/19/1996 96263-NWF-18	soil	861633.5625	432518.4063	Mercury	0	0.51999:	0.32898:	U	0	0.5	2	0	comp	post excavation, 3-pt composite, brown sand, w. sidewall		0 OAL			
96268-03	9/24/1996 96268-03	soil	861891.125	432400.9375	Mercury	0.89999	0.55:	0.62889:	U	0	1	0	0	grab	brown sand		0 OAL			
96268-05	9/24/1996 96268-05	soil	861787.125	432331.9375	Mercury	3.84	0.56:	0.64	U	0	1	0	0	grab	tan to brown sand		0 OAL			
96268-07	9/24/1996 96268-07	soil	861802.125	432353.9375	Mercury	0.89999	0.56999:	0.32898:	U	0	1	0	0	grab	tan to brown sand driller		0 OAL			
96268-09	9/24/1996 96268-09	soil	861797.125	432399.9375	Mercury	1.74	0.55:	0.78	U	0	1	0	0	grab	tan sand clinker		0 OAL			
96285-NREA-02	10/11/1996 96285-NREA-02	soil	861877.9375	432556.7813	Mercury	0	0.57999:	0.28989:	U	0.75	1	5	1	0	comp	post excavation (bottom), 5-pt composite, brown sand		0 OAL		
96290-03	10/16/1996 96290-03	soil	861663.125	432507.0375	Mercury	5	0.57999:	5	U	0	1	0	0	grab	brown sand with root debris		0 OAL			
96291-09	10/17/1996 96291-09	soil	861769.125	432552.9375	Mercury	4.58	0.62999:	0.58	U	0	0	0	0	comp	4-pt composite, brown coarse wet sand with brick fragments		0 OAL			
96303-NWF-29	10/29/1996 96303-NWF-29	soil	861670.9375	432556.9375	Mercury	4.04	0.52999:	0.28	U	0.13	2	0	0	comp	post excavation 3-pt west sidewall		0 OAL			
AC7-0	1/10/1995 AC7	soil	861594.125	432558.9375	Mercury	0.1	0:	0.2	U	0	2	0	0	grab			0 Col			
GPT-10-1	3/23/1995 GPT-10	soil	861951.5	432397	Mercury	2.9	0:	0.2	U	0	2	0	0	grab			0 Sav			
GPT-11-1	3/23/1995 GPT-11	soil	861926.3125	432398.25	Mercury	0	0.00999:	0.20989:	U	0	2	0	0	grab			0 Sav			
GPT-12-1	3/23/1995 GPT-12	soil	861897.5	432401.718	Mercury	3.3	0:	0.2	U	0	2	0	0	grab			0 Sav			
GPT-20-1	3/23/1995 GPT-20	soil	861962.4375	432495.0363	Mercury	0.36	0:	0.216	U	0	2	0	0	grab			0 Sav			
GPT-21-1	3/23/1995 GPT-21	soil	861938.8125	432498.1563	Mercury	0.69999	0:	0.20999:	U	0	2	0	0	grab			0 Sav			
GPT-22-1	3/23/1995 GPT-22	soil	861909.5625	432503.0822	Mercury	0.41999	0:	0.21399:	U	0	2	0	0	grab			0 Sav			
GPT-31-1	3/23/1995 GPT-31	soil	861946.8125	432595.379	Mercury	0.49	0:	0.208	U	0	2	0	0	grab			0 Sav			
GPT-32-1	3/23/1995 GPT-32	soil	861923.125	432603.0658	Mercury	3.9	0:	0.2	U	0	2	0	0	grab			0 Sav			
GPT-41-1	3/23/1995 GPT-41	soil	861965.1875	432695.8438	Mercury	0.19999	0:	0.21299:	U	0	2	0	0	grab			0 Sav			
GPT-42-1	3/23/1995 GPT-42	soil	861936.4375	432702.5	Mercury	1.2	0:	0.2	U	0	2	0	0	grab			0 Sav			

## Including Hardscape

Avg. Hg Concentration	Most Common Detection Limit	Grid Cell Area	Backfill/Soil Cover Area	Portion of Hardscape	Incomplete Exposure Area	Ecological Exposure Area	Weighted Avg. Hg Concentration
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	(ac)	(ppm)
2.1	0.57	4.00	1.74	0.29	50.8%	49.2%	1.1

## Excluding Hardscape

Avg. Hg Concentration	Most Common Detection Limit	Grid Cell Area	Backfill/Soil Cover Area	Portion of Hardscape	Incomplete Exposure Area	Ecological Exposure Area	Weighted Avg. Hg Concentration
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	(ac)	(ppm)
2.1	0.57	4.00	1.74	0.00	43.6%	56.4%	1.3

**Group 14: Grids 89, 90, 99, 100**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
08101-AC-3	4/10/2008	AC-3	soil	862021.0625	432384.9375	Mercury	12.3	0.005	12.3		0	0.5	0	0	grab	Upland 2008	0	CAS	
08101-HG-3	4/10/2008	HG-3	soil	862017	432520.8438	Mercury	0.892	0.0005	0.892		0	0.5	0	0	grab	Upland 2008	0	CAS	
08101-PB-3	4/10/2008	PB-3	soil	862250	432686.3438	Mercury	0.206	0.0005	0.206		0	0.5	0	0	grab	Upland 2008	0	CAS	
08102-AC-3-C	4/11/2008	AC-3	soil	862021.0625	432384.9375	Mercury	9.63	0.005	9.63		0	0.5	0	0	composite	Upland 2008	0	CAS	
08102-HG-3-C	4/11/2008	HG-3	soil	862017	432520.8438	Mercury	3.01	0.005	3.01		0	0.5	0	0	composite	Upland 2008	0	CAS	
08102-PB-3-C-R1	4/11/2008	PB-3	soil	862250	432686.3438	Mercury	2.13	0.005	2.13		0	0.5	0	0	composite	Upland 2008	0	CAS	
08102-PB-3-C-R2	4/11/2008	PB-3	soil	862250	432686.3438	Mercury	9.14	0.005	9.14		0	0.5	0	0	composite	Upland 2008	0	CAS	
09129-SL12-0-2	5/9/2009	SL12	soil	862156.5625	432652.0313	Mercury	0.023	0.0002	0.023		0	2	0	0	grab	May 2009 Upl	0	CAS	
96235-07	8/22/1996	96235-07	soil	862200.125	432405.9375	Mercury	5.74	0.57999	5.74		0	1	0	0	grab	brown sand	0	QAL	
96235-09	8/22/1996	96235-09	soil	862183.125	432383.9375	Mercury	14.09	0.56999	14.09		0	1	0	0	grab	brown sand	0	QAL	
96235-11	8/22/1996	96235-11	soil	862183.125	432337.9375	Mercury	3.15	0.56999	3.15		0	1	0	0	grab	brown sand	0	QAL	
96247-11	9/3/1996	96247-11	soil	862028.125	432511.9375	Mercury	5.99	0.54	5.99		0	1	0	0	grab	dark brown sand with petroleum stains, petroleum odor	0	QAL	
96247-14	9/3/1996	96247-14	soil	862011.125	432422.9375	Mercury	9.36	0.54	9.36		0	1	0	0	grab	brown sand with some grey	0	QAL	
96256-05	9/12/1996	96256-05	soil	862038.125	432752.9375	Mercury	0	0.58999	0.58999	U	0	1	0	0	grab	light to medium brown sand	0	QAL	
96256-07	9/12/1996	96256-07	soil	862012.125	432752.9375	Mercury	0.83999	0.58999	0.83999		0	1	0	0	grab	tan to brown sand	0	QAL	
96262-01	9/18/1996	96262-01	soil	862251	432563.4375	Mercury	1.29	0.57999	1.29		0	1	0	0	grab	brown sand with trace hardened black material	0	QAL	
96262-12	9/18/1996	96262-12	soil	862330.3125	432745.9375	Mercury	1.35	0.56	1.35		0	1	0	0	grab	brown to tan sand, trace black hardened material	0	QAL	
96262-14	9/18/1996	96262-14	soil	862230.625	432730.25	Mercury	1.72	0.56999	1.72		0	1	0	0	grab	black cinder-like material with trace debris	0	QAL	
96269-bcf-03	9/25/1996	96269-BCF-03	soil	862013.875	432741.875	Mercury	2.04	0.57999	2.04		0	2	2	0	comp	post excavation west sidewall 3-pt	0	QAL	
96277-06	10/3/1996	96277-06	soil	862145.625	432578.75	Mercury	3.97	0.57999	3.97		0	1	0	0	grab	lt brown sand organic material	0	QAL	
96277-09	10/3/1996	96277-09	soil	862156.3125	432672.5625	Mercury	18.1	0.6	18.1		0	1	0	0	grab	dirt pile, brn sand organic mat, clinker	0	QAL	
96277-28	10/3/1996	96277-28	soil	862215.125	432720.9375	Mercury	13	0.70999	13		0	1	0	0	grab	loamy sand	0	QAL	
96277-29	10/3/1996	96277-29	soil	862262.125	432730.9063	Mercury	0.91	0.56999	0.91		0	1	0	0	grab	reddish tan sand	0	QAL	
96284-09	10/10/1996	96284-09	soil	862217.125	432692.9375	Mercury	10	0.79	10		0	1	0	0	grab	brown wet sand with organic material	0	QAL	
96290-04	10/16/1996	96290-04	soil	862141.125	432556.9375	Mercury	1.02	0.57999	1.02		0	1	0	0	grab	brown sand with root debris	0	QAL	
96312-07	11/7/1996	96312-07	soil	862060.125	432745.9375	Mercury	20.8	0.55	20.8		0	1	0	0	grab	brown sand	0	QAL	
96318-SBC-03	11/13/1996	96318-SBC-03	soil	862204.125	432513.9375	Mercury	1.89	0.56	1.89		0	2	2	0	comp	post excavation 3-pt north sidewall	0	QAL	
96327-01	11/22/1996	96327-01	soil	862298.125	432678.9063	Mercury	2.16	0.57999	2.16		0	1	0	0	grab	brown sand with gravel size hard black material	0	QAL	
96327-02	11/22/1996	96327-02	soil	862248.125	432738.9063	Mercury	2.55	0.56999	2.55		0	1	0	0	grab	orange-brown sand, organics, brick pieces	0	QAL	
97028-08	1/28/1997	97028-08	soil	862274.125	432421.9063	Mercury	1.44	0.58999	1.44		0	1.7	2	0	comp	post excavation north sidewall 3-pt	0	QAL	
97028-10	1/28/1997	97028-10	soil	862286.125	432397.9063	Mercury	0.56	0.58999	0.56		0	1.8	2	0	comp	post excavation east sidewall 3-pt	0	QAL	
97034-07	2/3/1997	97034-07	soil	862098.125	432407.9375	Mercury	2.86	0.56999	2.86		0	1	0	0	grab	characterization NE corner locker room	0	QAL	
97036-03	2/5/1997	97036-03	soil	862280.125	432467.9063	Mercury	19.4	0.56	19.4		0	1	0	0	grab	characterization east side boiler house	0	QAL	
97069-NCA-07	3/10/1997	97069-NCA-07	soil	862145.125	432602.9375	Mercury	1.54	0.54	1.54		0	1.5	2	0	comp	post excavation E sidewall 3-pt	0	QAL	
97071-02	3/12/1997	97071-02	soil	862070.125	432491.9375	Mercury	9.11	0.51999	9.11		0	0.1	0	0	comp	surface samples 5-pt	0	QAL	
97071-03	3/12/1997	97071-03	soil	862030.125	432507.9375	Mercury	9.98	0.52999	9.98		0	0.1	0	0	comp	surface samples 5-pt	0	QAL	
97071-04	3/12/1997	97071-04	soil	862236.125	432543.9375	Mercury	15.4	0.54	15.4		0	0.1	0	0	comp	surface samples 5-pt	0	QAL	
97071-NCA-16	3/12/1997	97071-NCA-16	soil	862150.125	432665.9375	Mercury	3.81	0.52999	3.81		0	1.7	2	0	comp	post excavation E sidewall 3-pt	0	QAL	
97072-NCA-22	3/13/1997	97072-NCA-22	soil	862078.125	432549.9375	Mercury	1.63	0.52999	1.63		0	1	2	0	comp	post excavation S sidewall 3-pt	0	QAL	
97076-01	3/17/1997	97076-01	soil	862295.625	432637.4063	Mercury	14.6	0.56	14.6		0.3	0.5	1	0	comp	post excavation bottom 5-pt, scrape area	0	QAL	
97076-NCA-26	3/17/1997	97076-NCA-26	soil	862088.625	432752.5313	Mercury	2.14	0.52999	2.14	J9R	0	1	2	0	comp	post excavation W sidewall 3-pt	0	QAL	
97128-01	5/8/1997	97128-01	soil	862318.125	432589.9063	Mercury	4.32	0.54	4.32		0	0.1	0	0	comp	road sample 5-pt	0	QAL	

*Including Hardscape*

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
5.8	0.57	4.00	1.21	0.70	47.8%	52.3%	3.2

*Excluding Hardscape*

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
5.8	0.57	4.00	1.21	0.00	30.3%	69.8%	4.1

Group 15: Grids 93, 94, 103, 104

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_05DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
LC-207-SLA	10/14/1994	LC-207	soil	863031.125	432373.9063	Mercury	9.3	0	9.3	0	1	0	0	0 comp				0 ESD	
LC-208-SLA	10/14/1994	LC-208	soil	863061.125	432474.9063	Mercury	1.4	0	1.4	0	1	0	0	0 comp				0 ESD	
LC-209-SLA	10/15/1994	LC-209	soil	863065.125	432533.9063	Mercury	38	0	38	0	1	0	0	0 comp				0 ESD	
LC-210-SLA	10/15/1994	LC-210	soil	863076.125	432611.9063	Mercury	32	0	32	0	1	0	0	0 comp				0 ESD	
LC-211-SLA	10/19/1994	LC-211	soil	863074.125	432668.9063	Mercury	2.2	0	2.2	0	1	0	0	0 comp				0 ESD	
LC-213-SLA	10/15/1994	LC-213	soil	862857.125	432525.9063	Mercury	0.44999	0	0.44999	0	1	0	0	0 comp				0 ESD	
LC-214-SLA	10/15/1994	LC-214	soil	862902.125	432685.9063	Mercury	2.9	0	2.9	0	1	0	0	0 comp				0 ESD	

Avg. Hg Concentration	Most Common Detection Limit	Backfill/Soil Grid Cell Area	Incomplete Cover Area	Ecological Portion of Exposure Area	Weighted Avg. Hg Concentration
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ppm)
12.3	0.57	3.01	1.38	0.00	6.8

**Group 16: Grids 105, 106, 113, 114**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
97020-NREA-30	1/20/1997	97020-NREA-30	soil	861898.125	433047.9375	Mercury	0	0.58999	0.284995U	0	2	2	0	comp	post excavation 3-pt north sidewall	0 QAL			
97021-NREA-35	1/21/1997	97021-NREA-35	soil	861854.125	433041.9375	Mercury	0	0.56	0.283U	0.5	0.5	1	0	comp	post excavation 5-pt bottom	0 QAL			
97021-NREA-36	1/21/1997	97021-NREA-36	soil	861840.125	433009.9375	Mercury	0	0.57999	0.289995U	0.5	0.5	1	0	comp	post excavation 5-pt bottom	0 QAL			
97049-10	2/18/1997	97049-10	soil	861926.125	432933.9375	Mercury	0	0.56	0.283U	0.1	0.1	1	0	comp	power screen scrape area 5-pt	0 QAL			
97058-09	2/27/1997	97058-09	soil	861946.125	432975.9375	Mercury	0	0.56	0.283U	0	0.1	1	0	comp	scrape in backfill @ pugmill area	0 QAL			
97066-01	3/7/1997	97066-01	soil	861884.125	433065.9375	Mercury	5.18	0.54	5.18U	0	0.1	0	0	grab	soil @ concrete tank supports	0 QAL			
97066-02	3/7/1997	97066-02	soil	861880.125	433091.9375	Mercury	2.13	0.62999	2.13U	0	0.1	0	0	grab	soil @ concrete tank supports	0 QAL			
97066-03	3/7/1997	97066-03	soil	861891.125	433117.9375	Mercury	0.62	0.56999	0.62U	0	0.1	0	0	grab	soil @ concrete tank supports	0 QAL			
LC-201-SLA	10/17/1994	LC-201	soil	861887.125	433090.9375	Mercury	0	0.05	0.025U	0	1	0	0	comp	Characterization	0 ESD			

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
1.0	0.57	3.16	2.22	0.00	70.2%	29.8%	0.51

**Group 17: Grids 107, 108, 115, 116**

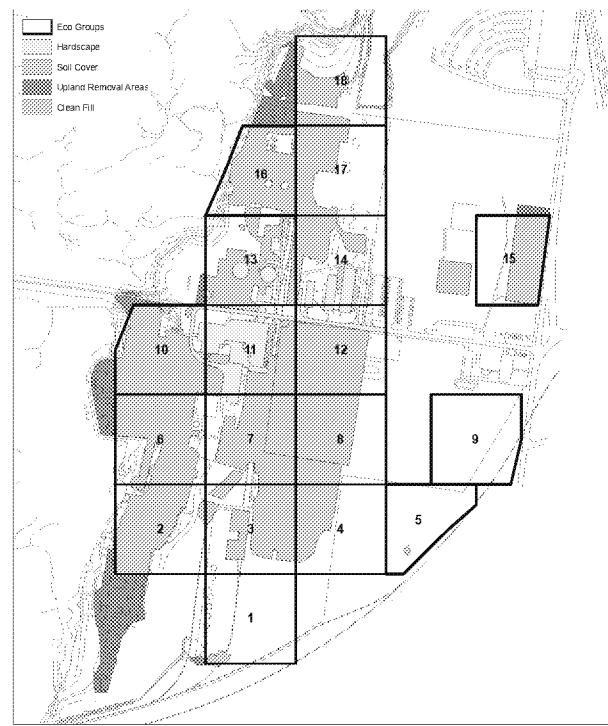
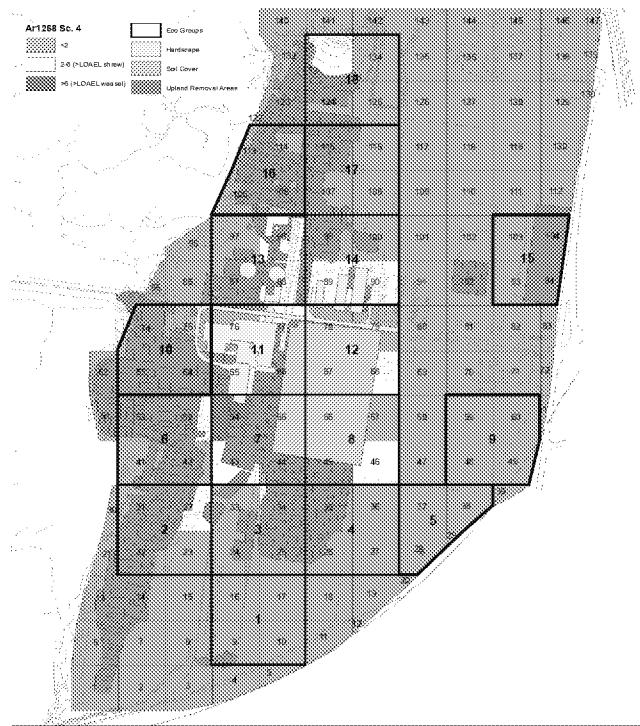
SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
96213-14	7/31/1996	96213-14	soil	862039.125	432865.9375	Mercury	3.2	0.57999	3.2	0	0.1	0	0	0 comp	5-pt composite surface samples from roads at north side of site	0	QAL		
96213-15	7/31/1996	96213-15	soil	862396.125	433039.9063	Mercury	10.3	0.51999	10.3	0	0.1	0	0	0 comp	5-pt composite surface samples from roads at north side of site	0	QAL		
96213-16	7/31/1996	96213-16	soil	862346.125	432761.9063	Mercury	2.78	0.51999	2.78	0	0.1	0	0	0 comp	5-pt composite surface samples from roads at north side of site	0	QAL		
96260-05	9/16/1996	96260-05	soil	862285.1875	433148.9063	Mercury	0	0.54	0.273U	0	0.1	0	0	0 grab	brown sand with trace tan sand	0	QAL		
96260-07	9/16/1996	96260-07	soil	862383.625	433131.5625	Mercury	0	0.56	0.288U	0	0.1	0	0	0 grab	brown sand with debris (i.e., brick, ballast)	0	QAL		
96260-09	9/16/1996	96260-09	soil	862369.4375	433021.4375	Mercury	0	0.51999	0.25999U	0	0.1	0	0	0 grab	brown loamy sand with root debris	0	QAL		
96260-11	9/16/1996	96260-11	soil	862288.3125	433031.1875	Mercury	0.75999	0.56	0.41999U	0	0.1	0	0	0 grab	dark brown sand	0	QAL		
96260-13	9/16/1996	96260-13	soil	862233.3125	433039.9375	Mercury	0	0.56999	0.283898U	0	0.1	0	0	0 grab	tan sand with rust stains	0	QAL		
96260-15	9/16/1996	96260-15	soil	862352.375	432927.1563	Mercury	0	0.55	0.273U	0	0.1	0	0	0 grab	dark brown sand with loamy material	0	QAL		
96261-15	9/17/1996	96261-15	soil	862272.125	432960.0625	Mercury	0	0.52999	0.265898U	0	0.1	0	0	0 grab	brown loamy sand	0	QAL		
96261-18	9/17/1996	96261-18	soil	862214.5	432953.625	Mercury	0	0.56	0.288U	0	0.1	0	0	0 grab	brown sand with trace tan sand	0	QAL		
96261-20	9/17/1996	96261-20	soil	862343.8125	432825.1875	Mercury	0.88999	0.56	0.43999U	0	0.1	0	0	0 grab	dark brown loamy sand with root debris	0	QAL		
96262-10	9/18/1996	96262-10	soil	862043.125	432783.9375	Mercury	1.58	0.54	1.38U	0	0.1	0	0	0 grab	brown sand	0	QAL		
96263-01	9/19/1996	96263-01	soil	862279.125	432820.625	Mercury	6.67	0.57999	6.67	0	0.5	0	0	0 grab	dark brown loamy sand with root debris and whit/beige fibrous materia	0	QAL		
96263-02	9/19/1996	96263-02	soil	862179.75	432828.3125	Mercury	20.8	0.56999	20.8	0	0.1	0	0	0 grab	light brown to tan sand	0	QAL		
96263-04	9/19/1996	96263-04	soil	862106	432877.3438	Mercury	0.63999	0.57999	0.63999U	0	0.1	0	0	0 grab	light brown loamy sand	0	QAL		
96277-16	10/3/1996	96277-16	soil	862187.75	432754.4375	Mercury	12.4	0.57999	12.4	0	0.1	0	0	0 grab	brown sand	0	QAL		
96277-24	10/3/1996	96277-24	soil	862233.5625	433100.9688	Mercury	0	0.56	0.288U	0	0.1	0	0	0 grab	brown sand organic material	0	QAL		
96277-26	10/3/1996	96277-26	soil	862279.125	432835.625	Mercury	3.16	0.63999	3.16	0	0.1	0	0	0 grab	brn loamy sand white crumbly mat.	0	QAL		
96277-27	10/3/1996	96277-27	soil	862299.125	432820.625	Mercury	6.07	0.68999	6.07	0	0.1	0	0	0 grab	brn sand organic material	0	QAL		
96284-01	10/10/1996	96284-01	soil	862316.125	432822.9063	Mercury	1.43	0.62999	1.43	0	0.1	0	0	0 grab	brown to black sand, small stones, granular metal fragments	0	QAL		
96284-03	10/10/1996	96284-03	soil	862282.125	432865.9063	Mercury	1.31	0.68999	1.31	0	0.5	0	0	0 grab	brown wet sand, organic debris	0	QAL		
96284-08	10/10/1996	96284-08	soil	862172.125	432806.9375	Mercury	10	0.61	10	0	0.1	0	0	0 grab	brown sand with organic material	0	QAL		
96304-01	10/30/1996	96304-01	soil	862065.125	432757.3438	Mercury	10.4	0.56999	10.4	0	0.1	0	0	0 grab	delineation hand auger sample	0	QAL		
96304-05	10/30/1996	96304-05	soil	862144.125	432784.9375	Mercury	2.66	0.54	2.66U%	0	0.1	0	0	0 grab	delineation hand auger sample	0	QAL		
96304-06	10/30/1996	96304-06	soil	862192.125	432774.9375	Mercury	2.63	0.55	2.63U	0	0.1	0	0	0 grab	delineation hand auger sample	0	QAL		
96304-07	10/30/1996	96304-07	soil	862246.125	432784.9063	Mercury	2.37	0.58999	2.37	0	0.1	0	0	0 grab	delineation hand auger sample	0	QAL		
96319-NCA-04	11/14/1996	96319-NCA-04	soil	862215.875	433093.5938	Mercury	0.70999	0.62	0.70999U	0	0.5	2	2	0 comp	post excavation 3-pt south sidewall	0	QAL		
96319-NCA-05	11/14/1996	96319-NCA-05	soil	862240	433156.125	Mercury	0	0.55	0.273U	0	0.5	2	2	0 comp	post excavation 3-pt east sidewall	0	QAL		
96327-03	11/22/1996	96327-03	soil	862238.125	432758.9063	Mercury	2.14	0.56	2.14U	0	0.1	0	0	0 grab	black hard granular material and brown sand	0	QAL		
96327-04	11/22/1996	96327-04	soil	862358.125	432782.9063	Mercury	0	0.56	0.288U	0	0.1	0	0	0 grab	brown sand with gravel size hard black material	0	QAL		
96327-06	11/22/1996	96327-06	soil	862298.125	432848.9063	Mercury	2.03	0.56999	2.03	0	0.5	0	0	0 grab	brown loamy sand, organics, white gravel size material	0	QAL		
96327-07	11/22/1996	96327-07	soil	862248.125	432838.9063	Mercury	0.67	0.52999	0.67	0	0.1	0	0	0 grab	gray fibrous material, brown loamy sand	0	QAL		
96327-08	11/22/1996	96327-08	soil	862348.125	432958.9063	Mercury	0.76999	0.56999	0.76999U	0	0.1	0	0	0 grab	dark brown loamy asnd, organics	0	QAL		
96327-09	11/22/1996	96327-09	soil	862298.125	432968.9063	Mercury	0	0.56999	0.288995U	0	0.1	0	0	0 grab	black hard granular material & brown sand	0	QAL		
96327-10	11/22/1996	96327-10	soil	862288.125	432998.9063	Mercury	0	0.56999	0.288995U	0	0.1	0	0	0 grab	black hard granular material & tan sand	0	QAL		
96327-11	11/22/1996	96327-11	soil	862308.125	432998.9063	Mercury	1.18	0.55	1.18U	0	0.1	0	0	0 grab	brown loamy sand, organics	0	QAL		
97058-08	2/27/1997	97058-08	soil	861996.125	432943.9375	Mercury	0	0.56	0.288U	0	0.1	1	1	0 comp	scrape in backfill @ pugmill area	0	QAL		
97071-NCA-19	3/12/1997	97071-NCA-19	soil	862174.125	432791.9375	Mercury	15.4	0.51999	15.4	0	1	2	2	0 comp	post excavation N sidewall 3-pt	0	QAL		
97072-01	3/13/1997	97072-01	soil	862054.125	432929.9375	Mercury	6.27	0.56999	6.27	0	0.3	1	1	0 comp	scrape area 5-pt	0	QAL		
97072-02	3/13/1997	97072-02	soil	862054.125	432791.9375	Mercury	3.96	0.52999	3.96	0	0.3	1	1	0 comp	scrape area 5-pt	0	QAL		
97076-NCA-25	3/17/1997	97076-NCA-25	soil	862104.4375	432761.125	Mercury	6.9	0.55	6.9U	0.5	1	1	1	0 comp	post excavation 5-pt bottom	0	QAL		
97128-02	5/8/1997	97128-02	soil	862350.125	432803.9063	Mercury	1.76	0.51999	1.76	0	0.1	0	0	0 comp	road sample 5-pt	0	QAL		
97128-03	5/8/1997	97128-03	soil	862376.125	433013.9063	Mercury	0.95999	0.6	0.59999U	0	0.1	0	0	0 comp	road sample 5-pt	0	QAL		
97128-04	5/8/1997	97128-04	soil	862396.125	433169.9063	Mercury	0.8	0.5	0.5U	0	0.1	0	0	0 comp	road sample 5-pt	0	QAL		

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Incomplete Hardscape (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
3.3	0.57	4.00	1.52	0.00	38.1%	61.9% 2.1

**Group 18: Grids 124, 125, 133, 134**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT	0.5DL	R_MOD	D1	D2	POST	EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
96242-07	8/29/1996	96242-07	soil	862045.125	433535.9375	Mercury	1.23	0.88999	1.23	0	1	0	0	0	0	0	0 grab	brown sand, grey flakes	0	QAL	
96242-08	8/29/1996	96242-08	soil	862024.125	433478.9375	Mercury	2.15	0.88999	2.15	0	1	0	0	0	0	0	0 grab	brown sand, organic debris	0	QAL	
96242-09	8/29/1996	96242-09	soil	862015.125	433461.9375	Mercury	0	0.68	0.34	U	0	1	0	0	0	0	0 grab	brown sand, petroleum odor	0	QAL	
96277-18	10/3/1996	96277-18	soil	862221.1875	433229.4063	Mercury	0	0.55	0.275	U	0	1	0	0	0	0	0 grab	brown sand trace clinker	0	QAL	
96277-20	10/3/1996	96277-20	soil	862251.1875	433229.375	Mercury	0.77999	0.56	0.77999	0.77999	0	1	0	0	0	0	0 grab	brown sand loamy	0	QAL	
96296-08	10/22/1996	96296-08	soil	862220.125	433288.9063	Mercury	0	0.56	0.28	U	0	1	0	0	0	0	0 grab	delineation sample	0	QAL	
96296-10	10/22/1996	96296-10	soil	862223.125	433337.9063	Mercury	0	0.56999	0.28999	U	0	1	0	0	0	0	0 grab	delineation sample	0	QAL	
96298-01	10/24/1996	96298-01	soil	862191.125	433271.9375	Mercury	0.73	0.55	0.73	U	0	1	0	0	0	0	0 grab	delineation sample	0	QAL	
96312-10	11/7/1996	96312-10	soil	862164.125	433235.9375	Mercury	0	0.56999	0.28999	U	0	1	0	0	0	0	0 grab	brown sand with black hard material	0	QAL	
96312-12	11/7/1996	96312-12	soil	862080.125	433247.9375	Mercury	0.81999	0.6	0.81999	0.6	0	1	0	0	0	0	0 grab	brown sand with black hard material	0	QAL	
96319-NCA-06	11/14/1996	96319-NCA-06	soil	862227.0625	433205.0313	Mercury	0	0.54	0.27	U	0	1.3	2	0	0	0	0 comp	post excavation 3-pt north sidewall	0	QAL	
96337-NRA-135	12/2/1996	96337-NRA-135	soil	862004.125	433274.1563	Mercury	1.52	0.61	0.52	U	0	2	2	0	0	0	0 comp	post excavation 3-pt south sidewall	0	QAL	

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Incomplete Hardscape (ac)	Portion of Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
0.75	0.57	3.28	1.07	0.00	32.8%	67.2%	0.60

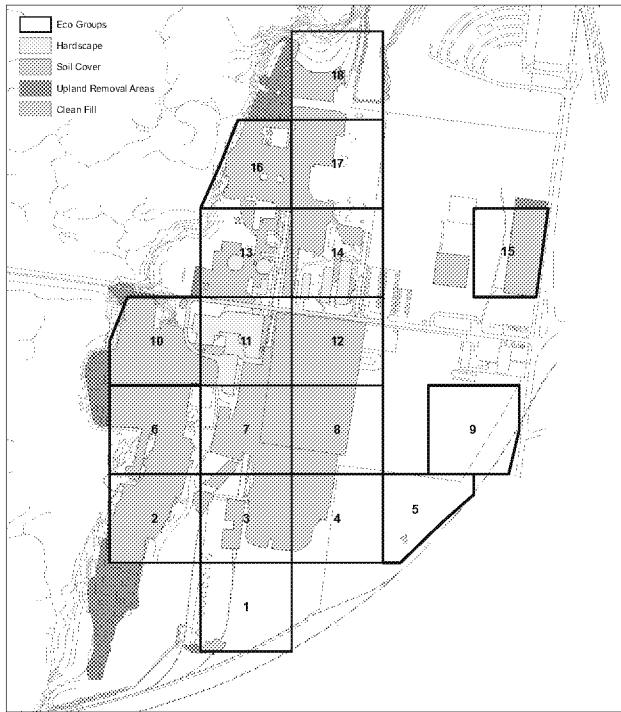


### Total PCBs

Group	Grids	Total PCB Adjusted for Backfill (mg/kg)	Total PCB Further Adjusted for Hardscape (mg/kg)
1	9,10,16,17	0.1	0.1
2	22,23,31,32	0.6	0.6
3	24,25,33,34	0.4	0.4
4	26,27,35,36	0.2	0.2
5	28,29,37,38	0.0	0.0
6	41,42,52,53	0.3	0.3
7	43,44,54,55	1	1
8	45,46,56,57	2	2
9	48,49,59,60	0.8	0.8
10	63,64,74,75	0.6	0.4
11	65,66,76,77	4	1
12	67,68,78,79	0.8	0.7
13	87,88,97,98	1	0.9
14	89,90,99,100	2	2
15	93,94,103,104	0.0	0.0
16	105,106,113,114	0.0	0.0
17	107,108,115,116	0.0	0.0
18	124,125,133,134	0.0	0.0

Notes:  $\geq 2$  mg/kg ( $>\text{LOAEL}$  for shrew)

Group	Grids	Area (ac)	Clean Fill/Cover (ac)	Hardscape (ac)
1	9,10,16,17	4.00	0.11	0.00
2	22,23,31,32	4.00	2.22	0.00
3	24,25,33,34	4.00	2.15	0.00
4	26,27,35,36	4.00	1.19	0.00
5	28,29,37,38	2.74	0.02	0.00
6	41,42,52,53	4.00	2.80	0.00
7	43,44,54,55	4.00	2.85	0.05
8	45,46,56,57	4.00	2.40	0.00
9	48,49,59,60	3.89	0.00	0.00
10	63,64,74,75	3.81	2.92	0.24
11	65,66,76,77	4.00	1.60	1.72
12	67,68,78,79	4.00	2.35	0.11
13	87,88,97,98	4.00	1.74	0.29
14	89,90,99,100	4.00	1.21	0.70
15	93,94,103,104	3.01	1.38	0.00
16	105,106,113,114	3.16	2.22	0.00
17	107,108,115,116	4.00	1.52	0.00
18	124,125,133,134	3.28	1.07	0.00



Group No.	Area (ac)	Grids	COPCs
1	4.0	9,10,16,17	Pb
2	4.0	22,23,31,32	PCBs, Hg
3	4.0	24,25,33,34	PCBs, Hg
4	4.0	26,27,35,36	Hg
5	2.7	28,29,37,38	Hg
6	4.0	41,42,52,53	PCBs, Hg
7	4.0	43,44,54,55	PCBs, Hg
8	4.0	45,46,56,57	PCBs, Hg
9	3.9	48,49,58,59	Hg
10	3.8	63,64,74,75	PCBs, Hg
11	4.0	65,66,76,77	PCBs, Hg, Pb
12	4.0	67,68,78,79	PCBs, Hg
13	4.0	87,88,97,98	PCBs
14	4.0	89,90,99,100	PCBs, Hg
15	3.0	93,94,103,104	Hg
16	3.2	105,106,113,114	Pb
17	4.0	107,108,115,116	Hg, Pb
18	3.3	124,125,133,134	Pb

Clean Fill/Soil Cover				
FID	Shape *	Area (ac)	Group	Area SUM (ac)
40	Polygon	0.514984	N/A	
43	Polygon	0.110631	1	0.11
25	Polygon	0.066022	2	
26	Polygon	2.123541	2	
27	Polygon	0.022086	2	
28	Polygon	0.009739	2	2.22
13	Polygon	0.109607	3	
21	Polygon	1.556586	3	
23	Polygon	0.395991	3	
24	Polygon	0.090122	3	2.15
20	Polygon	1.192803	4	1.19
22	Polygon	0.018485	5	0.02
29	Polygon	2.802358	6	2.80
12	Polygon	0.090999	7	
14	Polygon	1.949515	7	
18	Polygon	0.805872	7	2.85
15	Polygon	0.52521	8	
19	Polygon	1.875249	8	2.40
32	Polygon	0.026238	10	
34	Polygon	0.026898	10	
35	Polygon	2.8276	10	
36	Polygon	0.009222	10	
37	Polygon	0.031375	10	2.92
9	Polygon	0.066821	11	
10	Polygon	0.094771	11	
11	Polygon	0.37119	11	
16	Polygon	0.654591	11	
30	Polygon	0.010589	11	
31	Polygon	0.083283	11	
33	Polygon	0.090542	11	
38	Polygon	0.223645	11	1.60
7	Polygon	0.009611	12	
8	Polygon	0.006964	12	
17	Polygon	2.328606	12	2.35
0	Polygon	1.531813	13	
4	Polygon	0.199083	13	
2	Polygon	0.013537	13	1.74
3	Polygon	1.096109	14	
5	Polygon	0.064366	14	
6	Polygon	0.047415	14	1.21
39	Polygon	1.377055	15	1.38
41	Polygon	2.217089	16	2.22
1	Polygon	1.524481	17	1.52
42	Polygon	1.074579	18	1.07

Hardscape				
FID	Shape *	Area (ac)	Group	Area SUM (ac)
19	Polygon	0.047824	7	0.05
5	Polygon	0.09217	10	
6	Polygon	0.076771	10	
7	Polygon	0.056332	10	
8	Polygon	0.011886	10	0.24
4	Polygon	0.902412	11	
9	Polygon	0.184555	11	
16	Polygon	0.024732	11	
18	Polygon	0.327395	11	
22	Polygon	0.022551	11	
23	Polygon	0.257919	11	1.72
1	Polygon	0.010023	12	
3	Polygon	0.026239	12	
13	Polygon	0.044343	12	
17	Polygon	0.032709	12	0.11
14	Polygon	0.080127	13	
15	Polygon	0.004257	13	
20	Polygon	0.103819	13	
21	Polygon	0.100822	13	0.29
0	Polygon	0.090558	14	
2	Polygon	0.144308	14	
10	Polygon	0.029547	14	
11	Polygon	0.217217	14	
12	Polygon	0.214901	14	0.70

**Group 1: Grids 9, 10, 16, 17**

SAMPLE_ID	DATE_SAMPLE	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	AR1254_PPM	AR1254_DL	AR1260_PPM	AR1260_DL	AR1268_PPM	AR1268_DL	TOTAL_DETECTS	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB
08101-AC-1	4/10/2008 AC-1	soil	861867.625	430726.75	0	0.0019	0	0.061	0.48	0.0019	0	0.42	0	0.5	0	0	grab	Upland 2008 Sampling Event	0 CAS	
08101-PB-2	4/10/2008 PB-2	soil	861620.875	430809.8125	0	0.019	0	0.019	1.5	0.019	0	1.5	0	0.5	0	0	grab	Upland 2008 Sampling Event	0 CAS	
08102-AC-1-C	4/11/2008 AC-1	soil	861867.625	430726.75	0	0.0019	0	0.034	0.35	0.0019	0	0.35	0	0.5	0	0	composite	Upland 2008 Sampling Event	0 CAS	
08102-PB-2-C	4/11/2008 PB-2	soil	861620.875	430809.8125	0	0.0019	0	0.057	0.46	0.0019	0	0.46	0	0.5	0	0	composite	Upland 2008 Sampling Event	0 CAS	
94341-06	12/7/1994 94341-06	soil	861748.0625	431038.9375	0	0.0386	0	0.0386	0	0.0386	0	0.42	0	1	0	0	grab	Proposed Containment Cell Area	0 Eco	
94343-06	12/9/1994 94343-06	soil	861869.0625	430798.9375	0	0.0367	0	0.0367	0.133	0.0367	0	0.35	0	1	0	0	grab	Proposed Containment Cell Area	0 Eco	
94343-08	12/9/1994 94343-08	soil	861947.0625	430994.9375	0	0.0359	0	0.0359	0	0.0359	0	0.35	0	1	0	0	grab	Proposed Containment Cell Area	0 Eco	
94344-01	12/10/1994 94344-01	soil	861788.0625	430720.9375	0	0.0368	0	0.0368	0	0.0368	0	0.35	0	1	0	0	grab	Proposed Containment Cell Area	0 Eco	
94344-03	12/10/1994 94344-03	soil	861879.0625	430722.9375	0	0.0345	0	0.0345	0.04179	0.0345	0	0.35	0	1	0	0	grab	Proposed Containment Cell Area	0 Eco	
94344-05	12/10/1994 94344-05	soil	861970.0625	430773.9375	0	0.037	0	0.037	0	0.037	0	0.35	0	1	0	0	grab	Proposed Containment Cell Area	0 Eco	
94344-07	12/10/1994 94344-07	soil	861937.0625	430914.9375	0	0.0358	0	0.0358	0.0619	0.0358	0	0.35	0	1	0	0	grab	Proposed Containment Cell Area	0 Eco	
95039-15	2/8/1995 95039-15	soil	861765.0625	431051.9375	0	0.038	0	0.038	0	0.038	0	0.35	0	1	0	0	grab	Proposed Containment Cell Area	0 Eco	
950235-OST-31	8/23/1995 OST-31	soil	861606.0625	430889.9375	0	0.11	0	0.11	0.2	0.11	0	0.35	0	1	0	0	grab	W. Side OST Area	0 Pac	
96255-21	9/1/1996 96255-21	soil	861679.0625	431048.9375	0	2.39	0	2.39	0	2.39	0	0.35	0	1	0	0	grab	brown sand with traces of rust material	0 QAL	
96255-23	9/1/1996 96255-23	soil	861679.0625	430948.9375	0	2.15	0	2.15	0	2.15	0	0.35	0	1	0	0	grab	brown sand with some root mass	0 QAL	
97140-04	5/20/1997 97140-04	soil	861711.0625	430672.9375	0	2.07	0	2.07	0	2.07	0	0.35	0	1	0	0	comp	limestone road surface sample 5-pt	0 QAL	
97140-05	5/20/1997 97140-05	soil	861742.0625	431013.9375	0	2.06	0	2.06	0	2.06	0	0.35	0	1	0	0	comp	limestone road surface sample 5-pt	0 QAL	
98064-BMA-01	3/5/1998 98064-BMA-01	soil	861956.0625	431070.9375	0	2.31	0	2.31	0	2.31	0	0.35	0	1	1	0	comp	brine mud stockpile area	0 QAL	
98064-BMA-02	3/5/1998 98064-BMA-02	soil	861951.0625	431028.9375	0	2.28	0	2.28	0	2.28	0	0.35	0	1	1	0	comp	brine mud stockpile area	0 QAL	
98064-BMA-06	3/5/1998 98064-BMA-06	soil	861898.0625	431035.9375	0	2.32	0	2.32	0	2.32	0	0.35	0	1	1	0	comp	brine mud stockpile area	0 QAL	
98064-BMA-07	3/5/1998 98064-BMA-07	soil	861821.0625	430963.9375	0	2.35	0	2.35	0	2.35	0	0.35	0	1	1	0	comp	brine mud stockpile area	0 QAL	
98071-BMA-10	3/12/1998 98071-BMA-10	soil	861842.0625	431047.9375	0	2.67	0	2.67	0	2.67	0	0.35	0	1	1	0	comp	brine mud stockpile area	0 QAL	
98071-BMA-11	3/12/1998 98071-BMA-11	soil	861836.0625	431003.9375	0	2.51	0	2.51	0	2.51	0	0.35	0	1	1	0	comp	brine mud stockpile area	0 QAL	
98075-BMA-12	3/16/1998 98075-BMA-12	soil	861806.0625	431053.9375	0	2.22	0	2.22	0	2.22	0	0.35	0	0	1	0	comp	brine mud stockpile area	0 QAL	
98279-BMA-13	10/6/1998 98279-BMA-13	soil	861778.0625	431043.9375	0	2.24	0	2.24	0	2.24	0	0.35	0	1	1	0	comp	brine mud stockpile area	0 QAL	
LC-634-SIA	12/1/1994 LC-634	soil	861639.0625	431026.9375	0	0.035	0	0.035	0	0.035	0	0.35	0	1	0	0	comp	brine mud stockpile area	0 ESD	
LC-635-SIA	12/1/1994 LC-635	soil	861622.0625	430806.9375	0	0.035	0	0.035	0	0.035	0	0.35	0	1	0	0	comp	brine mud stockpile area	0 ESD	

Avg. PCB Conc. (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. PCB Conc. (ppm)
0.12	0.017	4.00	0.11	0.00	2.8%	97.2%	0.12

**Group 2: Grids 22, 23, 31, 32**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	AR1254_PPM	AR1254_DL	AR1254_DIDL	AR1260_PPM	AR1260_DL	AR1268_PPM	AR1268_DL	TOTAL_DETECTS	DL	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB
09129-S3-0-2	5/9/2009 SL-3	soil	861565.625	431287.3125	0.057	0.012	0.057	0	0.012	1.1	0.012	0.012	1	0	2	0	0	0 grab	May 2009 Upland Soil Sampling	0 CAS	
96214-01	8/1/1996 96214-01	soil	861529.0625	431248.9375	0	2.11	0.211	0	2.11	0	2.11	0	0	1	0	0	0	0 grab	Phase IIIC Characterization samples	0 QAL	
96214-03	8/1/1996 96214-03	soil	861429.0625	431148.9375	0	2.07	0.207	0	2.07	0	2.07	0	0	1	0	0	0	0 grab	Phase IIIC Characterization samples	0 QAL	
96214-05	8/1/1996 96214-05	soil	861529.0625	431148.9375	0	2.15	0.215	0	2.15	0	2.15	0	0	1	0	0	0	0 grab	Phase IIIC Characterization samples	0 QAL	
97086-SRA-102	3/27/1997 97086-SRA-102	soil	861263.25	431447.4375	0	2.32	0.232	0	2.32	0	2.32	0	0	2	2	2	0	0 comp	post excavation 3-pt N sidewall	0 QAL	
97097-SRA-121	4/7/1997 97097-SRA-121	soil	861185.25	431344.3438	0	2.22	0.222	0	2.22	3.1	2.22	3.1	0	1	2	0	0	0 comp	post excavation 3-pt W sidewall	0 QAL	
97107-BM4-19	4/17/1997 97107-BM4-19	soil	861489.75	431419.8438	0	2.27	0.227	0	2.27	7.9	2.27	7.9	0	1.5	2	0	0	0 comp	post excavation E sidewall 3 pt	0 QAL	
97125-BM3-09	5/5/1997 97125-BM3-09	soil	861395.5625	431268.3438	0	2.06	0.206	0	2.06	2.3	2.06	2.3	0.5	0.5	1	0	0	0 comp	post excavation 5-pt bottom	0 QAL	
97135-03	5/15/1997 97135-03	soil	861536.0625	431413.9375	0	2.07	0.207	0	2.07	0	2.07	0	0	0.1	0	0	0	0 comp	road surface sample 5-pt	0 QAL	
97135-04	5/15/1997 97135-04	soil	861484.0625	431287.9375	0	2.07	0.207	0	2.07	0	2.07	0	0	0.1	0	0	0	0 comp	road surface sample 5-pt	0 QAL	

Backfill/Soil						
Most Common	Incomplete	Ecological	Weighted Avg.	PCB Conc.	Cover Area	Exposure Area
Avg. PCB Conc. (ppm)	Detection Limit (ppm)	Grid Cell Area (ac)	Portion of Hardscape (ac)	(ac)	(ac)	{ppm}
1.4	0.017	4.00	2.22	0.00	55.5%	44.5% 0.64

**Group 3: Grids 24, 25, 33, 34**

SAMPLE_ID	DATE_SAMPLE	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	ARI254_PPM	ARI254_DL	ARI260_PPM	ARI260_DL	ARI298_PPM	ARI298_DL	TOTAL_DETECTS	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
08101-AC-2	4/10/2008 AC-2	soil		861641.75	431449.75	0	0.012	0	0.029	0.2	0.0017	0	0.5	0	0	0	grab	Upland 2008 Sampling Event	0	CAS	
08102-AC-2-C	4/1/2008 AC-2	soil		861641.75	431449.75	0.02	0.0017	0	0.025	0.16	0.0017	0	0.5	0	0	0	composite	Upland 2008 Sampling Event	0	CAS	
94208-10	7/27/1994 94208-10	soil		861771.0625	431479.9375	0	0.0399	0	0.0399	0.374	0.0020	0	1	0	0	0	comp	2nd most S		Eco	
94341-08	12/7/1994 94341-08	soil		861776.0625	431138.9375	0.392	0.0392	0	0.0392	0.404	0.0032	0	1	0	0	0	grab	Proposed Containment Cell Area		Eco	
94342-19	12/8/1994 94342-19	soil		861865.0625	431119.9375	1.07	0.0811	0	0.0811	3.07	0.0811	0	1	0	0	0	grab	Proposed Containment Cell Area		Eco	
94343-11	12/9/1994 94343-11	soil		861970.0625	431100.9375	0	0.0415	0	0.0415	0.0855	0.0415	0	1	0	0	0	grab	Proposed Containment Cell Area		Eco	
96169-M50	6/17/1996 96169-M50	soil		861990.25	431163.125	0	2.14	0	2.14	0	2.14	0	0.5	1	1	0	0	comp	post excavation bottom 5-pt	0	QAL
96256-01	9/12/1996 96256-01	soil		861629.0625	431148.9375	0	2.34	0	2.34	0	2.34	0	0.1	0	0	0	grab	tan sand with trace amount of roots	0	QAL	
96256-03	9/12/1996 96256-03	soil		861629.0625	431248.9375	0	2.24	0	2.24	0	2.24	0	0.1	0	0	0	grab	brown to tan sand	0	QAL	
97121-OST-18	5/1/1997 97121-OST-18	soil		861685.0625	431146.9375	0	2.3	0	2.3	0	2.3	0	1.5	2	0	0	0	comp	post excavation 5 sidewall 3-pt	0	QAL
97121-OST-19	5/1/1997 97121-OST-19	soil		861674.0625	431190.9375	0	2.16	0	2.16	0	2.16	0	0.5	2	0	0	0	comp	post excavation N sidewall 3-pt	0	QAL
97121-OST-21	5/1/1997 97121-OST-21	soil		861693.0625	431237.9375	0	2.28	0	2.28	0	2.28	0	1.5	2	0	0	0	comp	post excavation N sidewall 3-pt	0	QAL
97122-OST-26	5/2/1997 97122-OST-26	soil		861703.0625	431277.9375	0	2.28	0	2.28	5.9	2.28	0	1.5	2	0	0	0	comp	post excavation S sidewall 3-pt	0	QAL
97122-OST-27	5/2/1997 97122-OST-27	soil		861691.0625	431325.9375	0	2.21	0	2.21	0	2.21	0	1.25	2	0	0	0	comp	post excavation W sidewall 3-pt	0	QAL
97122-OST-29	5/2/1997 97122-OST-29	soil		861721.1875	431382.25	0	2.27	0	2.27	2.8	2.27	0	1.5	2	0	0	0	comp	post excavation N sidewall 3-pt	0	QAL
97170-M108	6/19/1997 97170-M108	soil		861821.0625	431365.9375	0	0.36	0	0.36	2.6	0.36	0	1.5	2	0	0	0	comp	Post excavation South sidewall 3-point	0	Sav
98064-BMA-04	3/5/1998 98064-BMA-04	soil		861914.0625	431123.9375	0	2.35	0	2.35	0	2.35	0	0.5	1	1	0	0	comp	brine mud stockpile area	0	QAL
98064-BMA-05	3/5/1998 98064-BMA-05	soil		861906.0625	431081.9375	0	2.29	0	2.29	0	2.29	0	0.5	1	1	0	0	comp	brine mud stockpile area	0	QAL
98071-BMA-08	3/12/1998 98071-BMA-08	soil		861859.0625	431131.9375	0	2.49	0	2.49	0	2.49	0	0.5	1	1	0	0	comp	brine mud stockpile area	0	QAL
98071-BMA-09	3/12/1998 98071-BMA-09	soil		861852.0625	431091.9375	0	3.36	0	3.36	0	3.36	0	0.5	1	1	0	0	comp	brine mud stockpile area	0	QAL
18241-LC-639_1A <sup>(1)</sup>	8/29/2018 LC-639_1	soil		861643.0625	431158.9375	0	0.069	0	0.0694	1.54	0.0546	0	1	0	0	0	comp		ALPHA		
18241-LC-639_1B <sup>(2)</sup>	8/29/2018 LC-639_1	soil		861643.0625	431158.9375	0	0.0081	0	0.0081	0.111	0.0081	0	2	0	0	0	comp		ALPHA		

Notes: <sup>(1)</sup> Reported Aroclor 1262 at 1.25 mg/kg

<sup>(2)</sup> Reported Aroclor 1262 at 0.112 mg/kg

Avg. PCB Conc. (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. PCB Conc. (ppm)
0.91	0.017	4.00	2.15	0.00	53.8%	46.2%	0.42

**Group 4: 26, 27, 35, 36**

SAMPLE_ID	DATE_SAMPLE	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	ARI254_PPM	ARI254_DL	ARI260_PPM	ARI260_DL	ARI268_PPM	ARI268_DL	TOTAL	DETECTS	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB
08101-HG-2	4/10/2008	H-G-2	soil	862001.1875	431132.6875	0	0.0078	0	0.018	0.14	0.0017	0.18	0	0.5	0	0	0	grab	Upland 2008 Sampling Event	0 CAS	
08102-HG-2-C	4/11/2008	H-G-2	soil	862001.1875	431132.6875	0	0.037	0	0.05	0.27	0.0017	5.27	0	0.5	0	0	0	composite	Upland 2008 Sampling Event	0 CAS	
94344-14	12/10/1994	94344-14	soil	862025.5625	431089.3438	0	0.0361	0	0.0361	0	0.0361	5	0	1	0	0	0	grab	Proposed Containment Cell Area	0 Eco	
LC-621-SLA	12/1/1994	LC-621	soil	862323.0625	431375.9375	0	0.04	1.2	0	0	0	1.2	0	1	0	0	0	comp		0 ESD	
LC-622-SLA	12/1/1994	LC-622	soil	862296.0625	431111.9375	0	0.039	0	0.039	0	0.039	5	0	1	0	0	0	comp		0 ESD	

Most Common		Portion of	Incomplete	Ecological	Weighted Avg.	
Avg. PCB Conc.	Detection Limit	Grid Cell Area	Backfill/Soil	Exposure Area	Exposure Area	PCB Conc.
(ppm)	(ppm)	(ac)	Cover Area (ac)	(ac)	(ac)	{ppm}
0.32	0.017	4.00	1.19	0.00	29.8%	70.2%
						0.23

**Group 5: 28, 29, 37, 38**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	AR1254_PPM	AR1254_DL	AR1260_PPM	AR1260_DL	AR1268_PPM	AR1268_DL	TOTAL_DETECTS	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
96331-RI-13	11/27/1996	96331-RI-13	soil	862813.563	431491.4063	0	2.26	0	2.26	0	2.26	0	0	1	0	0	0 comp/grat brown & gray loamy sand	0 QAL	0		
LC-620-SLA	12/1/1994	LC-620	soil	862546.063	431308.9063	0	0.039	0	0.039	0	0.039	0	0	1	0	0	0 comp	0 ESD	0		
<hr/>																					
Avg. PCB Conc. (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. PCB Conc. (ppm)														
0.00	0.017	2.74	0.00	0.00	0.0%	100.0%	0.00														

**Group 6: 41, 42, 52, 53**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	ARI254_PPM	ARI254_DL	ARI260_PPM	ARI260_DL	ARI268_PPM	ARI268_DL	TOTAL_DETECTS	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
09129-SL13-0-2	5/9/2009	SL-13	soil	861561.25	431791.0313	0.27	0.021	0	0.021	3.2	0.021	3.47	0	2	0	0	grab	May 2009 Upland Soil Sampling	0	CAS	
09130-SL9-0-2	5/10/2009	SL-9	soil	861241.375	431584.8125	0.0036	0.00209	0	0.00209	0.075	0.00209	0.57	0	2	0	0	grab	May 2009 Upland Soil Sampling	0	CAS	
94196-08	7/15/1994	94196-08	soil	861448.0625	431681.9375	0.145	0.0399	0	0.0399	2.17	0.06159	2.35	0	1	0	0	comp	W area		Eco	
97104-02	4/14/1997	97104-02	soil	861347.0625	431614.9375	0	2.27	0	2.27	0	2.27	0	0	0.1	0	0	comp	area of drum sump W BM4 5-pt		QAL	
97111-BM4-26	4/21/1997	97111-BM4-26	soil	861524.5625	431565.4375	0	2.25	0	2.25	0	2.25	0	0	2	2	0	comp	post excavation E sidewalk 3-pt		QAL	
97114-BM4-31	4/24/1997	97114-BM4-31	soil	861514	431621.8438	0	2.31	0	2.31	2.3	2.31	2.3	0.1	0.1	1	0	comp	post excavation bottom 5-pt		QAL	
98156-MED-40	6/5/1998	98156-MED-40	soil	861195.5	431621.6563	0	2.19	0	2.19	1.85	2.19	1.85	0	1	0	2	grab	marsh exc. east delineation		QAL	
98156-MED-41	6/5/1998	98156-MED-40	soil	861195.5	431621.6563	0	2.2	0	2.2	2.96	2.2	2.96	0	1	0	0	grab	dip of 98156-med-40		QAL	
98156-MED-43	6/5/1998	98156-MED-43	soil	861200.3125	431661.6563	0	2.15	0	2.15	0	2.15	0	0	1	0	2	grab	marsh exc. east delineation		QAL	
98156-MED-45	6/5/1998	98156-MED-45	soil	861253.0625	431617.9375	0	2.28	0	2.28	0	2.28	0	0	1	0	2	grab	marsh exc. east delineation		QAL	
99153-LRC-03	6/2/1999	99153-LRC-03	soil	861516.0625	431683.9375	0	0.017	0	0.017	0.095	0.017	0.095	0.017	0	0.2	1	0	comp	limrock road confirmational		Kem
99153-LRC-04	6/2/1999	99153-LRC-04	soil	861356.0625	431771.9375	0	0.017	0	0.017	0.18	0.017	0.18	0.017	0	0.2	1	0	comp	limrock road confirmational		Kem
99159-USC-17	6/8/1999	99159-USC-17	soil	861236.0625	431903.9375	0	0.017	0	0.017	0.45	0.017	0.45	0.017	0	0.2	1	0	comp	limrock road confirmational		Kem
18241-LC-204_1 <sup>(1)</sup>	8/29/2018	LC-204_1	soil	861568.0625	431896.9375	0	0.00836	0	0.00836	0.083	0.00836	0.083	0.00836	0.77	0	1	0	comp	upland soil confirmational E. WPA		ALPHA

Notes: <sup>(1)</sup> Reported Aroclor 1262 at 0.0944 mg/kg

Most Common		Incomplete		Ecological		Weighted Avg.	
Avg. PCB Conc. (ppm)	Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Exposure Area (ac)	Exposure Area (ac)	PCB Conc. (ppm)
1.0	0.017	4.00	2.80	0.00	70.1%	29.9%	0.39

## Group 7: 43, 44, 54, 55

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	AR1254_PPM	AR1254_DL	AR1260_PPM	AR1260_DL	AR1268_PPM	AR1268_DL	TOTAL_DETECTS	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
94196-04	7/15/1994	94196-04	soil	861605.0625	431649.9375	2.29	0.399	0	0.0399	9.06	0.411	14	0	1	0	0	comp	NW area	0	Eco	
94196-05	7/15/1994	94196-05	soil	861641.0625	431505.9375	1.14	0.0399	0	0.0399	4.35	0.205	5	0	1	0	0	comp	SE area	0	Eco	
96261-01	9/17/1996	96261-01	soil	861788.0625	431612.9375	0	2.33	0	2.33	0	2.33	0	0	1	0	0	grab	dark brown sand with black stains, petroleum hydrocarbon odor	0	QAL	
96298-SRY-24	10/24/1996	96298-SRY-24	soil	861827.875	431864.625	0	2.35	0	2.35	0	2.35	0	0	2	2	0	comp	post excavation east sidewall 3-pt	0	QAL	
97086-CTA-03	3/27/1997	97086-CTA-03	soil	861740.0625	431718.9375	2.7	2.39	0	2.39	6.2	2.39	8	0	2	2	0	comp	post excavation 3-pt S sidewall	0	QAL	
97135-02	5/15/1997	97135-02	soil	861576.0625	431553.9375	0	2.12	0	2.12	0	2.12	0	0	0.1	0	0	comp	road surface sample 5-pt	0	QAL	

## Including Hardscape

Most Common		Backfill/Soil		Incomplete		Ecological		Weighted Avg.
Avg. PCB Conc. (ppm)	Detection Limit (ppm)	Grid Cell Area (ac)	Cover Area (ac)	Portion of Hardscape (ac)	Exposure Area (ac)	Ecological Exposure Area (ac)	PCB Conc. (ppm)	
4.3	0.017	4.00	2.85	0.05	72.4%	27.6%	1.2	

## Excluding Hardscape

Most Common		Backfill/Soil		Incomplete		Ecological		Weighted Avg.
Avg. PCB Conc. (ppm)	Detection Limit (ppm)	Grid Cell Area (ac)	Cover Area (ac)	Portion of Hardscape (ac)	Exposure Area (ac)	Ecological Exposure Area (ac)	PCB Conc. (ppm)	
4.3	0.017	4.00	2.85	0.00	71.2%	28.8%	1.2	

**Group 8: 45, 46, 56, 57**

SAMPLE ID	DATE SAMPL	LOCATION	MATRIX	X STATEPLA	Y STATEPLA	AR1254 PPM	AR1254 DL	AR1260 PPM	AR1260 DL	AR1268 PPM	AR1268 DL	TOTAL DETECTS	D1	D2	POST EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
08217-CS10-0.5	8/4/2008	CS10	Soil	862336.5625	431688.9375	0.17	0.017	0	0.017	4.1	0.017	4.73	0	0.5	0	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS10-1.5	8/4/2008	CS10	Soil	862336.5625	431688.9375	0	0.037	0	0.0017	0.24	0.0017	3.24	0.5	1.5	0	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS11-0.5	8/4/2008	CS11	Soil	862343.0625	431648	0.17	0.034	0	0.034	10	0.034	10.7	0	0.5	0	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS11-1.5	8/4/2008	CS11	Soil	862343.0625	431648	0	0.017	0	0.017	0.96	0.017	3.95	0.5	1.5	0	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS12-0.5	8/4/2008	CS12	Soil	862284.4375	431595.625	0.46	0.017	0	0.017	1.5	0.017	1.95	0.5	1.5	0	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS12-1.5	8/4/2008	CS12	Soil	862284.4375	431595.625	0.46	0.017	0	0.017	3.5	0.017	3.88	0.5	1.5	0	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS9-0.5	8/4/2008	CS9	Soil	862338.0625	431740.8125	0.18	0.017	0	0.017	1.9	0.017	2.05	0.5	1.5	0	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS9-1.5	8/4/2008	CS9	Soil	862338.0625	431740.8125	0.017	0.0017	0	0.0017	0.33	0.0017	0.382	0.5	1.5	0	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
09129-SL21-0-2	5/9/2009	SL-21	soil	862315.8125	431633.3438	0.63	0.021	0	0.021	2.4	0.021	3.05	0	2	0	0	0 grab	May 2009 Upland Soill Sampling	0	CAS	
97042-03	2/11/1997	97042-03	soil	862302.0625	431865.9063	0	2.27	0	2.27	2.7	2.27	2.7	0	1	0	0	0 grab	characterization east of cell buildings	0	QAL	
97042-06	2/11/1997	97042-06	soil	862286.0625	431767.9375	0	2.35	0	2.35	0	2.35	3	0	1	0	0	0 grab	characterization east of cell buildings	0	QAL	

Most Common	Backfill/Soil	Portion of	Incomplete	Ecological	Weighted Avg.		
Avg. PCB Conc.	Detection Limit	Grid Cell Area	Cover Area	Hardscape	Exposure Area	Exposure Area	PCB Conc.
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	(ac)	(ppm)
4.2	0.017	4.00	2.40	0.00	60.0%	40.0%	1.7

**Group 9: Grids 48, 49, 48, 59, 60**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	AR1254_PPM	AR1254_DL	AR1260_PPM	R1260_DL	AR1268_PPM	AR1268_DL	TOTAL_DETECTS	D1	D2	DST_REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB		
08217-CS2-0.5	8/4/2008 CS2	Soil	862649.063	431881.9688	0.33	0.017	0	0.0017	0.056	0.0017	0.0017	3.03	0	0.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS			
08217-CS2-1.5	8/4/2008 CS2	Soil	862649.063	431881.9688	0	0.0017	0	0.0017	0.056	0.0017	0.0017	0.0017	0.0017	0.5	1.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS		
08217-CS3-0.5	8/4/2008 CS3	Soil	862673.063	431878.5313	0.14	0.017	0	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.5	1.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS3-1.5	8/4/2008 CS3	Soil	862673.063	431878.5313	0	0.0017	0	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.5	1.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS4-0.5	8/4/2008 CS4	Soil	862777.125	431859.125	0.14	0.017	0	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.5	1.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS4-1.5	8/4/2008 CS4	Soil	862777.125	431859.125	0	0.0017	0	0.0017	0.028	0.0017	0.0017	0.0017	0.0017	0.0017	0.5	1.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS5-0.5	8/4/2008 CS5	Soil	862790.875	431860.5	0.09	0.017	0	0.0017	0.017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.5	0.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS
08217-CS5-1.5	8/4/2008 CS5	Soil	862790.875	431860.5	0	0.0017	0	0.0017	0.014	0.0017	0.0017	0.0017	0.0017	0.0017	0.5	1.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS6-0.5	8/4/2008 CS6	Soil	862722.063	431820.2813	0.18	0.017	0	0.0017	0.017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.5	0.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS
08217-CS6-1.5	8/4/2008 CS6	Soil	862722.063	431820.2813	0	0.0017	0	0.0017	0.051	0.0017	0.0017	0.0017	0.0017	0.0017	0.5	1.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS7-0.5	8/4/2008 CS7	Soil	862718.063	431796.0938	0.15	0.017	0	0.0017	0.017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.5	0.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS
08217-CS7-1.5	8/4/2008 CS7	Soil	862718.063	431796.0938	0	0.0017	0	0.0017	0.041	0.0017	0.0017	0.0017	0.0017	0.0017	0.5	1.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS	
08217-CS8-0.5	8/4/2008 CS8	Soil	862792.438	431858.9688	0.13	0.017	0	0.0017	0.017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.5	1.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS
08217-CS8-1.5	8/4/2008 CS8	Soil	862792.438	431858.9688	0.013	0.0017	0	0.0017	0.41	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.5	0.5	0	0 grab	Conf. PCB Upland Soil 2008	0	CAS
96331-RI-11	11/27/1996 96331-RI-11	soil	862938.563	431616.4063	0	2.39	0	2.39	0	2.39	0	2.39	0	2.39	0	1	0	0 comp/grat brown & gray loamy sand		0	QAL	
LC-616-SLA	12/1/1994 LC-616	soil	862954.063	431887.9063	0	0.037	0	0.037	0	0.037	0	0.037	0	0.037	0	1	0	0 comp		0	ESD	
LC-617-SLA	12/1/1994 LC-617	soil	862698.063	431750.9063	0	0.04	0	0.04	0	0.04	0	0.04	0	0.04	0	1	0	0 comp		0	ESD	

Most Common		Backfill/Soil	Portion of	Incomplete	Ecological	Weighted Avg.														
Avg. PCB Conc.	(ppm)	Detection Limit	Grid Cell Area	Cover Area	Hardscape	Exposure Area	Exposure Area	PCB Conc.	(ac)	(ppm)										
0.80	0.017	3.89	0.00	0.00	0.0%	100.0%	0.80													

**Group 10: Grids 63, 64, 74, 75**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	ARI1254_PPM	ARI1254_DL	ARI1260_PPM	ARI1260_DL	ARI1268_PPM	ARI1268_DL	TOTAL_DETECTS	D1	D2	DST	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB
09129-SL24-0-2	5/9/2009	SL-24	soil	861395.625	432256.375	0.00469	0.00209	0	0.00209	0.053	0.00209	0.25749	0	2	0	0	grab	May 2009 Upland Soil Sampling	0 CAS	
96260-19	9/16/1996	96260-19	soil	861535.125	432233.9375	0	2.28	0	2.28	0	2.28	0.5	0	1	0	0	grab	brown to tan sand	0 QAL	
96283-CPS-01	10/9/1996	96283-CPS-01	soil	861568.0625	432097.9375	0	2.56	0	2.56	1.95	2.56	1.39	0.5	1	1	0	comp	post excavation, 5-pt composite	0 QAL	
96290-CPS-07	10/16/1996	96290-CPS-07	soil	861537.0625	432109.9375	0	2.36	0	2.36	12	2.36	1.4	0.5	1	1	0	comp	post excavation (bottom), 3-pt composite	0 QAL	
96290-CPS-08	10/16/1996	96290-CPS-08	soil	861543.0625	432117.9375	0	2.4	0	2.4	7.2	2.4	2.2	0	0.8	2	0	comp	post excavation (n. sidewall), 3-pt composite	0 QAL	
99074-USC-15	3/15/1999	99074-USC-15	soil	861348.125	432121.9375	0	0.017	0	0.017	0	0.017	0.017	0	0	0	1	0	comp area under OHM pool #2	0 Kem	
99074-USC-16	3/15/1999	99074-USC-16	soil	861366.125	432194.4375	0	0.018	0	0.018	0.034	0.018	0.034	0	0	1	0	0	comp area under OHM pool #3	0 Kem	
99159-LRC-05	6/8/1999	99159-LRC-05	soil	861336.125	432253.9375	0	0.017	0	0.017	0.23	0.017	0.23	0.23	0	0.2	1	0	comp limerock road confirmational	0 Kem	
99159-USC-18	6/8/1999	99159-USC-18	soil	861236.0625	432003.9375	0	0.017	0	0.017	0.9	0.087	0.9	0.9	0	0.2	1	0	comp upland soil confirmational E. WPA	0 Kem	

*Including Hardscape*

Most Common		Backfill/Soil		Portion of		Incomplete		Ecological		Weighted Avg.	
Avg. PCB Conc. (ppm)	Detection Limit (ppm)	Grid Cell Area (ac)	Cover Area (ac)	Hardscape (ac)	Exposure Area (ac)	Exposure Area (ac)	Exposure Area (ac)	PCB Conc. {ppm}	PCB Conc. {ppm}		
2.5	0.017	3.81	2.92	0.24	82.8%	17.2%	0.43				

*Excluding Hardscape*

Most Common		Backfill/Soil		Portion of		Incomplete		Ecological		Weighted Avg.	
Avg. PCB Conc. (ppm)	Detection Limit (ppm)	Grid Cell Area (ac)	Cover Area (ac)	Hardscape (ac)	Exposure Area (ac)	Exposure Area (ac)	Exposure Area (ac)	PCB Conc. {ppm}	PCB Conc. {ppm}		
2.5	0.017	3.81	2.92	0.00	76.6%	23.4%	0.58				

**Group 11: Grids 65, 66, 76, 77**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	AR1254_PPM	AR1254_DL	AR1260_PPM	AR1260_DL	AR1268_PPM	AR1268_DL	TOTAL_DETECTS	D1	D2	POST	EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
94208-06	7/27/1994	94208-06	soil	861937.125	432303.9375	7.13	0.797	0	0.797	9.66	0.403	16.7%	0	1	0	0	0	comp	just N of E-W road	0	Eco	
96247-16	9/3/1996	96247-16	soil	861969.125	432326.9375	6.1	2.15	0	2.15	3	2.15	0.3	0	1	0	0	0	grab	light brown to grey sand	0	QAL	
96261-CSA-01	9/17/1996	96261-CSA-01	soil	861799.5	432003.25	0	2.4	0	2.4	2.9	2.4	0.3	0.5	0.5	1	0	0	comp	post excavation; 4-pt composite from sump	0	QAL	
96262-CSA-02	9/18/1996	96262-CSA-02	soil	861791.0625	431957.9375	3.3	2.4	0	2.4	0	2.4	0.3	0.5	0.75	1	0	0	comp	post excavation; 5-pt composite, grey/brown sand, bottom	0	QAL	
96270-SRY-09	9/26/1996	96270-SRY-09	soil	861868.6875	431973.0625	0	2.35	0	2.35	0	2.35	0.3	0	1.5	1	0	0	comp	post excavation bottom 5-pt	0	QAL	
96284-CPS-02	10/10/1996	96284-CPS-02	soil	861612.0625	432088.9375	0	2.38	0	2.38	6	2.38	0.5	1	1	0	0	0	comp	post excavation (bottom), 5-pt composite, brown sand	0	QAL	
96317-SRY-40	11/12/1996	96317-SRY-40	soil	861885.5625	432246.125	0	2.28	0	2.28	5.7	2.28	0.5	1.25	2	0	0	0	comp	post excavation 3-pt north sidewall	0	QAL	
GPT-00-1	3/23/1995	GPT-00	soil	861938.125	432297.625	0.68	0	0.77	0	3.6	0	0	0	0	0	0	0	grab	0	Sav		
GPT-01-1	3/23/1995	GPT-01	soil	861913.25	432300.8438	0.43	0	2.2	0	6	0	0	0	0	0	0	0	grab	0	Sav		
GPT-02-1	3/23/1995	GPT-02	soil	861884.25	432305.4063	0.31	0	0.39	0	2	0	0	0	0	0	0	0	grab	0	Sav		

*Including Hardscape*

Most Common		Backfill/Soil		Incomplete		Ecological		Weighted Avg.
Avg. PCB Conc. (ppm)	Detection Limit (ppm)	Grid Cell Area (ac)	Cover Area (ac)	Hardscape (ac)	Exposure Area (ac)	Exposure Area (ac)	Ft <sup>2</sup> PCB Conc. (ppm)	
6.0	0.017	4.00	1.60	1.72	82.9%	17.1%	1.0	

*Excluding Hardscape*

Most Common		Backfill/Soil		Incomplete		Ecological		Weighted Avg.
Avg. PCB Conc. (ppm)	Detection Limit (ppm)	Grid Cell Area (ac)	Cover Area (ac)	Hardscape (ac)	Exposure Area (ac)	Exposure Area (ac)	PCB Conc. (ppm)	
6.0	0.017	4.00	1.60	0.00	39.9%	60.1%	3.6	

**Group 12: Grids 67, 68, 78, 79**

SAMPLE_ID	DATE_SAMPLE	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	AR1254_PPM	AR1254_DL	AR1260_PPM	AR1260_DL	AR1268_PPM	AR1268_DL	TOTAL_DETECTS	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
97034-01	2/3/1997	97034-01	soil	862228.125	432283.9375	3.2	2	0	2	0	2	3	0	1	0	0	grab characterization	south side boiler house	0	QAL	
97034-03	2/3/1997	97034-03	soil	862164.125	432283.9375	0	2.4	0	2.4	0	2.4	0	0	1	0	0	grab characterization	south side boiler house	0	QAL	
97034-05	2/3/1997	97034-05	soil	862112.125	432333.9375	0	2.31	0	2.31	0	2.31	0	0	1	0	0	grab characterization	west side boiler house	0	QAL	
97036-01	2/5/1997	97036-01	soil	862266.125	432329.9063	0	2.37	0	2.37	3.3	2.37	3	0	1	0	0	grab characterization	east side boiler house	0	QAL	
97042-01	2/11/1997	97042-01	soil	862318.0625	431967.9063	0	2.26	0	2.26	2.7	2.26	2	0	1	0	0	grab characterization	east of cell buildings	0	QAL	

*Including Hardscape*

Most Common		Backfill/Soil		Incomplete		Ecological		Weighted Avg.
Avg. PCB Conc. (ppm)	Detection Limit (ppm)	Grid Cell Area (ac)	Cover Area (ac)	Hardscape (ac)	Exposure Area (ac)	Exposure Area (ac)	PCB Conc. (ppm)	
1.8	0.017	4.00	2.35	0.11	61.5%	38.5%	0.7	

*Excluding Hardscape*

Most Common		Backfill/Soil		Incomplete		Ecological		Weighted Avg.
Avg. PCB Conc. (ppm)	Detection Limit (ppm)	Grid Cell Area (ac)	Cover Area (ac)	Hardscape (ac)	Exposure Area (ac)	Exposure Area (ac)	PCB Conc. (ppm)	
1.8	0.017	4.00	2.35	0.00	58.6%	41.4%	0.8	

## Group 13: 87, 88, 97, 98

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	AR1254_PPM	AR1254_DL	AR1260_PPM	AR1260_DL	AR1268_PPM	AR1268_DL	TOTAL_DETECTS	O1	O2	STL_F	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB	
09129_SL26-0-2	5/9/2009	SL-26	soil	861897.75	432398.0313	0.0028	0.00209	0	0.00209	0.0086	0.00209	0.3124	0	2	0	0	0 grab		May 2009 Upland Soil Sampling	O CAS	
94208-05	7/27/1994	94208-05	soil	861765.125	432505.9375	4.11	0.399	0	0.399	4.35	0.202	8.42	0	1	0	0	0 grab	3rd N most		O Eco	
96207-01	7/25/1996	96207-01	soil	861741.125	432748.9375	0	2.42	0	2.42	0	2.42	2	0	1	0	0	0 grab	hand auger boring samples south of north removal area		O OAL	
96207-04	7/25/1996	96207-04	soil	861741.125	432675.9375	0	2.4	0	2.4	0	2.4	3	0	1	0	0	0 grab	hand auger boring samples south of north removal area		O OAL	
96207-06	7/25/1996	96207-06	soil	861591.125	432648.9375	0	2.56	0	2.56	0	2.56	3	0	1	0	0	0 grab	hand auger boring samples south of north removal area		O OAL	
96207-07	7/25/1996	96207-07	soil	861691.125	432699.9375	0	3.16	0	3.16	0	3.16	3	0	1	0	0	0 grab	hand auger boring samples south of north removal area		O OAL	
96207-09	7/25/1996	96207-09	soil	861691.125	432748.9375	0	2.38	0	2.38	0	2.38	2	0	1	0	0	0 grab	hand auger boring samples south of north removal area		O OAL	
96207-10	7/25/1996	96207-10	soil	861649.125	432748.9375	0	2.76	0	2.76	0	2.76	3	0	1	0	0	0 grab	hand auger boring samples south of north removal area		O OAL	
96227-01	8/14/1996	96227-01	soil	861906.125	432579.9375	0	2.2	0	2.2	0	2.2	3	0	1	0	0	0 grab	brown to light gray sand		O OAL	
96227-03	8/14/1996	96227-03	soil	861891.125	432583.9375	0	2.16	0	2.16	0	2.16	3	0	1	0	0	0 grab	brown sand		O OAL	
96239-01	8/26/1996	96239-01	soil	861819.125	432588.9375	0	2.1	0	2.1	0	2.1	3	0	1	0	0	0 grab	tan sand		O OAL	
96239-04	8/26/1996	96239-04	soil	861784.125	432598.9375	0	2.11	0	2.11	0	2.11	3	0	1	0	0	0 grab	tan sand		O OAL	
96239-07	8/26/1996	96239-07	soil	861762.125	432595.9375	0	2.14	0	2.14	0	2.14	3	0	1	0	0	0 grab	tan sand		O OAL	
96239-09	8/26/1996	96239-09	soil	861800.125	432632.9375	0	2.11	7.3	2.11	21	2.11	3	0	1	0	0	0 grab	tan, trace brown sand		O OAL	
96239-14	8/26/1996	96239-14	soil	861742.125	432713.9375	3.3	2.13	0	2.13	0	2.13	2	0	1	0	0	0 grab	tan sand		O OAL	
96239-15	8/26/1996	96239-15	soil	861759.125	432713.9375	0	2.14	0	2.14	0	2.14	3	0	1	0	0	0 grab	tan sand		O OAL	
96247-NRA-101	9/3/1996	96247-NRA-101	soil	861754.0625	432697.0938	0	2.17	0	2.17	0	2.17	2	0	1	2	0	0 comp	post excavation, 3-pt composite, brown/grey sand, e. sidewall		O OAL	
96247-NRA-102	9/3/1996	96247-NRA-102	soil	861745.875	432683.4063	0	2.18	0	2.18	0	2.18	2	0	1	2	0	0 comp	post excavation, 3-pt composite, brown/grey sand, s. sidewall		O OAL	
96249-10	9/4/1996	96249-10	soil	861754.125	432670.9375	0	2.24	0	2.24	0	2.24	2	0	1	0	0	0 grab	dark brown sand with foamy material		O OAL	
96254-NWF-01	9/10/1996	96254-NWF-01	soil	861745.0625	432390.1563	0	2.3	0	2.3	0	2.3	2	0	1	3	0	0 comp	post excavation, 5-pt composite, brown sand with some black stained sand, hydrocarbon odor, bottom		O OAL	
96254-NWF-02	9/10/1996	96254-NWF-02	soil	861751.125	432404.9375	0	2.21	0	2.21	9	2.21	2	0	5	1	1	0 comp	post excavation, 5-pt composite, brown sand with some black stained sand, hydrocarbon odor, bottom		O OAL	
96255-NWF-03	9/11/1996	96255-NWF-03	soil	861744.9375	432338.125	0	2.35	0	2.35	0	2.35	2	0	5	0.8	1	0 grab	post excavation, 5-pt composite, brown and orange sand, bottom		O OAL	
96256-NWF-04	9/12/1996	96256-NWF-04	soil	861886.3125	432439.5625	3.1	2.24	0	2.24	0	2.24	2	0	5	0.8	1	0 comp	post excavation, 5-pt composite, brown sand, bottom		O OAL	
96256-NWF-05	9/12/1996	96256-NWF-05	soil	861700.125	432360.9375	0	2.28	0	2.28	0	2.28	2	0	5	0.8	1	0 comp	post excavation, 5-pt composite, brown sand, bottom		O OAL	
96260-NWF-06	9/16/1996	96260-NWF-06	soil	861637.5	432349.1563	0	2.52	0	2.52	0	2.52	2	0	5	0.8	1	0 comp	post excavation, 5-pt composite, brown sand, bottom		O OAL	
96260-NWF-07	9/16/1996	96260-NWF-07	soil	861646.125	432389.6563	0	2.23	0	2.23	0	2.23	2	0	5	0.8	1	0 comp	post excavation, 5-pt composite, brown sand, bottom		O OAL	
96262-NWF-09	9/18/1996	96262-NWF-09	soil	861594.8125	432437.7813	0	2.23	0	2.23	0	2.23	2	0	5	1	1	0 comp	post excavation, 5-pt composite, brown sand, bottom		O OAL	
96262-NWF-11	9/18/1996	96262-NWF-11	soil	861602.125	432466.9375	0	2.2	0	2.2	0	2.2	2	0	5	1	2	0 comp	post excavation, 5-pt composite, brown sand, n. sidewall		O OAL	
96263-NWF-16	9/19/1996	96263-NWF-16	soil	861664.3125	432503.5938	0	2.31	0	2.31	0	2.31	2	0	5	0.8	1	0 comp	post excavation, 5-pt composite, brown sand, bottom		O OAL	
96263-NWF-18	9/19/1996	96263-NWF-18	soil	861635.5625	432518.4063	0	2.07	0	2.07	0	2.07	2	0	5	0.5	2	0 comp	post excavation, 5-pt composite, brown sand, bottom		O OAL	
96268-03	9/24/1996	96268-03	soil	861891.125	432400.9375	0	2.19	0	2.19	0	2.19	2	0	1	0	0	0 grab	brown sand		O OAL	
96268-05	9/24/1996	96268-05	soil	861878.125	432411.9375	0	2.25	0	2.25	0	2.25	2	0	1	0	0	0 grab	tan to brown sand		O OAL	
96268-07	9/24/1996	96268-07	soil	861802.125	432353.9375	0	2.28	0	2.28	7.5	2.28	2	0	1	0	0	0 grab	tan to brown sand trace clinker		O OAL	
96268-09	9/24/1996	96268-09	soil	861797.125	432399.9375	0	2.21	0	2.21	4.2	2.21	2	0	1	0	0	0 grab	tan sand clinker		O OAL	
96275-NRE-01	10/1/1996	96275-NRE-01	soil	861828.8125	432407.0313	0	2.34	0	2.34	6.6	2.34	2	0	2	5	1	1	0 comp	post exc bottom 4 pt.		O OAL
96285-NRE-02	10/11/1996	96285-NRE-02	soil	861877.9375	432556.7813	0	2.34	0	2.34	0	2.34	2	0	7.5	15	1	0 comp	post excavation (bottom), 5-pt composite, brown sand		O OAL	
96290-03	10/16/1996	96290-03	soil	861663.125	432570.9375	0	2.3	0	2.3	0	2.3	2	0	1	0	0	0 grab	brown sand with root debris		O OAL	
96291-09	10/17/1996	96291-09	soil	861769.125	432552.9375	0	2.53	0	2.53	4.8	2.53	2	0	0	0	0	0 comp	4-pt composite, brown coarse wet sand with brick fragments		O OAL	
96303-NWF-29	10/20/1996	96303-NWF-29	soil	861670.8125	432556.0938	0	2.13	0	2.13	0	2.13	2	0	1	3	2	0	0 comp	post excavation 3-pt west sidewall		O OAL
AC7-0	1/10/1995	AC7-0	soil	861594.125	432558.9375	0	0.039	0.031	0	0	0.039	0.3521	0	2	0	0	0	0 grab		O Col	
GPT-10-1	3/23/1995	GPT-10	soil	861915.5	432397.16	0	0.48	0	0.48	0	0.46	0	0	5.52	0	2	0	0	0 grab		O Sav
GPT-11-1	3/23/1995	GPT-11-1	soil	861925.3125	432398.25	0.024	0	0.044	0	0.1	0	0	5.52	0	2	0	0	0	0 grab		O Sav
GPT-12-1	3/23/1995	GPT-12-1	soil	861897.5	432401.188	1.6	0	0.8	0	1.5	0	0	5.52	0	2	0	0	0	0 grab		O Sav
GPT-20-1	3/23/1995	GPT-20-1	soil	861964.4375	432495.0063	1.4	0	0.26	0	0.43	0	0	5.52	0	2	0	0	0	0 grab		O Sav
GPT-21-1	3/23/1995	GPT-21-1	soil	861938.8125	432498.1563	0.17	0	0	0.078	0.54	0	0	5.52	0	2	0	0	0	0 grab		O Sav
GPT-22-1	3/23/1995	GPT-22-1	soil	861909.5625	432500.8125	0	0.038	0.25	0	0.76	0	0	5.52	0	2	0	0	0	0 grab		O Sav
GPT-31-1	3/23/1995	GPT-31-1	soil	861946.8125	432595.375	2.4	0	0	0.038	0.071	0	0	5.52	0	2	0	0	0	0 grab		O Sav
GPT-32-1	3/23/1995	GPT-32-1	soil	861923.125	432600.9688	0.81	0	0	0.039	0.44	0	0	5.52	0	2	0	0	0	0 grab		O Sav
GPT-41-1	3/23/1995	GPT-41-1	soil	861965.1875	432695.8488	0.31	0	0	0.038	0.032	0	0	5.52	0	2	0	0	0	0 grab		O Sav
GPT-42-1	3/23/1995	GPT-42-1	soil	861936.4375	432702.5	0.1	0	0	0.04	0.056	0	0	5.52	0	2	0	0	0	0 grab		O Sav

## Including Hardscape

Avg. PCB Conc. (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Cover Area (ac)	Hardscape (ac)	Portion of Incomplete	Ecological Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. PCB Conc. (ppm)
1.9	0.017	4.00	1.74	0.00	43.6%	56.4%	1.1	0.93

Excluding Hardscape

Avg. PCB Conc. (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Cover Area (ac)	Hardscape (ac)	Portion of Incomplete	Ecological Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. PCB Conc. (ppm)
1.9	0.017	4.00	1.74	0.00	43.6%	56.4%	1.1	0.93

**Group 14: Grids 89, 90, 99, 100**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	AR1254_PPM	AR1254_DL	AR1260_PPM	AR1260_DL	AR1268_PPM	AR1268_DL	TOTAL_DETECTS	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB
08101-AC-3	4/10/2008 AC-3	soil	862021.0625	432384.9375	28	0.091	0	0.091	8.9	0.091	38.9	0	0.5	0	0	0 grab	Upland 2008 Sampling Event	0 CAS		
08101-HG-3	4/10/2008 HG-3	soil	862017	432520.8438	0.23	0.0085	0	0.0085	0.55	0.0085	3.5	0	0.5	0	0	0 grab	Upland 2008 Sampling Event	0 CAS		
08101-PB-3	4/10/2008 PB-3	soil	862250	432686.3438	0.1	0.0017	0	0.0017	0.028	0.0017	0.5	0	0.5	0	0	0 grab	Upland 2008 Sampling Event	0 CAS		
08102-AC-3-C	4/11/2008 AC-3	soil	862021.0625	432384.9375	4.4	0.034	0	0.034	6.1	0.034	15.5	0	0.5	0	0	0 composite	Upland 2008 Sampling Event	0 CAS		
08102-HG-3-C	4/11/2008 HG-3	soil	862017	432520.8438	0.24	0.017	0	0.017	0.57	0.017	3.1	0	0.5	0	0	0 composite	Upland 2008 Sampling Event	0 CAS		
08102-PB-3-C-R1	4/11/2008 PB-3	soil	862250	432686.3438	0.2	0.0017	0	0.0017	0.14	0.0017	0.4	0	0.5	0	0	0 composite	Upland 2008 Sampling Event	0 CAS		
08102-PB-3-C-R2	4/11/2008 PB-3	soil	862250	432686.3438	0.93	0.017	0	0.017	0.78	0.017	1.7	0	0.5	0	0	0 composite	Upland 2008 Sampling Event	0 CAS		
09129-SL12-0-2	5/9/2009 SL-12	soil	86156.5625	432652.0313	0	0.00209	0	0.00209	0	0.00209	0	0	2	0	0	0 grab	May 2009 Upland Soil Sampling	0 CAS		
96235-07	8/22/1996 96235-07	soil	862200.125	432405.9375	0	2.33	0	2.33	0	2.33	0	0	1	0	0	0 grab	brown sand	0 QAL		
96235-09	8/22/1996 96235-09	soil	862183.125	432583.9375	0	2.28	0	2.28	0	2.28	0	0	1	0	0	0 grab	brown sand	0 QAL		
96235-11	8/22/1996 96235-11	soil	862183.125	432337.9375	0	2.27	0	2.27	0	2.27	0	0	1	0	0	0 grab	brown sand	0 QAL		
96247-11	9/3/1996 96247-11	soil	862028.125	432511.9375	14	2.16	0	2.16	7.6	2.16	33.8	0	1	0	0	0 grab	dark brown sand with petroleum stains, petroleum odor	0 QAL		
96247-14	9/3/1996 96247-14	soil	862011.125	432422.9375	4.7	2.17	0	2.17	6	2.17	35.7	0	1	0	0	0 grab	brown sand with some grey	0 QAL		
96262-01	9/18/1996 96262-01	soil	862251	432563.4375	0	2.33	0	2.33	0	2.33	0	0	1	0	0	0 grab	brown sand with trace hardened black material	0 QAL		
96262-12	9/18/1996 96262-12	soil	862330.3125	432745.9375	0	2.26	0	2.26	0	2.26	0	0	1	0	0	0 grab	brown to tan sand, trace black hardened material	0 QAL		
96262-14	9/18/1996 96262-14	soil	862230.635	432730.25	0	2.27	0	2.27	0	2.27	0	0	1	0	0	0 grab	black cinder-like material with trace debris	0 QAL		
96277-06	10/3/1996 96277-06	soil	862145.625	432578.75	0	2.32	0	2.32	0	2.32	0	0	1	0	0	0 grab	lt brown sand organic material	0 QAL		
96277-09	10/3/1996 96277-09	soil	862156.3125	432672.5625	0	2.39	0	2.39	0	2.39	0	0	1	0	0	0 grab	dirt pile, brn sand organic mat., clinker	0 QAL		
96277-28	10/3/1996 96277-28	soil	862215.125	432720.9375	0	2.83	0	2.83	0	2.83	0	0	1	0	0	0 grab	brn loamy sand	0 QAL		
96277-29	10/3/1996 96277-29	soil	862262.125	432730.9063	0	2.28	0	2.28	0	2.28	0	0	1	0	0	0 grab	reddish tan sand	0 QAL		
96284-09	10/10/1996 96284-09	soil	862217.125	432692.9375	0	3.16	0	3.16	0	3.16	0	0	1	0	0	0 grab	brown wet sand with organic material	0 QAL		
96312-07	11/7/1996 96312-07	soil	862060.125	432745.9375	0	2.2	0	2.2	0	2.2	0	0	1	0	0	0 grab	brown sand	0 QAL		
96318-SBC-03	11/13/1996 96318-SBC-03	soil	862204.125	432513.9375	2.9	2.23	0	2.23	9.1	2.23	2.2	0	2	2	0	0 comp	post excavation 3-pt north sidewall	0 QAL		
97028-08	1/28/1997 97028-08	soil	862274.125	432421.9063	0	2.37	0	2.37	0	2.37	0	0	1.7	2	0	0 comp	post excavation north sidewall 3-pt	0 QAL		
97028-10	1/28/1997 97028-10	soil	862286.125	432397.9063	0	2.38	0	2.38	0	2.38	0	0	1.8	2	0	0 comp	post excavation east sidewall 3-pt	0 QAL		
97034-07	2/3/1997 97034-07	soil	862098.125	432407.9375	0	2.29	0	2.29	0	2.29	0	0	1	0	0	0 grab	characterization NE corner locker room	0 QAL		
97036-03	2/5/1997 97036-03	soil	862280.125	432467.9063	0	2.23	0	2.23	0	2.23	0	0	1	0	0	0 grab	characterization east side boiler house	0 QAL		
97069-NCA-07	3/10/1997 97069-NCA-07	soil	862145.125	432602.9375	0	2.18	0	2.18	0	2.18	0	0	1.5	2	0	0 comp	post excavation E sidewall 3-pt	0 QAL		
97071-02	3/12/1997 97071-02	soil	862070.125	432491.9375	2.2	2.07	0	2.07	5.2	2.07	2.1	0	0.1	0	0	0 comp	surface samples 5-pt	0 QAL		
97071-03	3/12/1997 97071-03	soil	862030.125	432507.9375	2.1	2.13	0	2.13	4.3	2.13	2.1	0	0.1	0	0	0 comp	surface samples 5-pt	0 QAL		
97071-04	3/12/1997 97071-04	soil	862236.125	432548.9375	0	2.17	0	2.17	0	2.17	0	0	0.1	0	0	0 comp	surface samples 5-pt	0 QAL		
97071-NCA-16	3/12/1997 97071-NCA-16	soil	862150.125	432665.9375	0	2.14	0	2.14	0	2.14	0	0	1.7	2	0	0 comp	post excavation E sidewall 3-pt	0 QAL		
97072-NCA-22	3/13/1997 97072-NCA-22	soil	862078.125	432549.9375	0	2.13	0	2.13	0	2.13	0	0	1	2	0	0 comp	post excavation S sidewall 3-pt	0 QAL		
97076-01	3/17/1997 97076-01	soil	862295.625	432637.4063	2.9	2.23	0	2.23	0	2.23	0	0	0.5	1	0	0 comp	post excavation bottom 5-pt, scrape area	0 QAL		
97076-NCA-26	3/17/1997 97076-NCA-26	soil	862088.625	432752.5313	2.6	2.12	0	2.12	0	2.12	0	0	1	2	0	0 comp	post excavation W sidewall 3-pt	0 QAL		
97128-01	5/8/1997 97128-01	soil	862318.125	432589.9063	0	2.16	0	2.16	0	2.16	0	0	0.1	0	0	0 comp	road sample 5-pt	0 QAL		

*Including Hardscape*

Avg. PCB Conc. (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. PCB Conc. (ppm)
3.2	0.017	4.00	1.21	0.70	47.6%	52.4%	1.7

*Excluding Hardscape*

Avg. PCB Conc. (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. PCB Conc. (ppm)
3.2	0.017	4.00	1.21	0.00	30.2%	69.8%	2.2

**Group 15: Grids 93, 94, 103, 104**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	AR1254_PPM	AR1254_DL	AR1260_PPM	AR1260_DL	AR1268_PPM	AR1268_DL	TOTAL_DETECTS	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
97049-10	2/18/1997	97049-10	soil	861926.125	432933.9375	0	2.23	0	2.23	0	2.23	0	0.1	0.1	1	0 comp	power screen scrape area 5-pt	0 QAL			
97058-09	2/27/1997	97058-09	soil	861946.125	432975.9375	0	2.24	0	2.24	0	2.24	0	0	0.1	1	0 comp	scrape in backfill @ pugmill area	0 QAL			
<hr/>																					
Avg. PCB Conc. (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Incomplete Portion of Hardscape (ac)	Ecological Exposure Area (ac)	Weighted Avg. PCB Conc. (ppm)															
0.00	0.017	3.01	1.38	0.00	45.7%	54.3%															

**Group 16: Grids 105, 106, 113, 114**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	AR1254_PPM	AR1254_DL	AR1260_PPM	AR1260_DL	AR1268_PPM	AR1268_DL	TOTAL_DETECTS	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
97049-10	2/18/1997	97049-10	soil	861926.125	432933.9375	0	2.23	0	2.23	0	2.23	3	0.1	0.1	1	0	comp	power screen scrape area 5-pt	0 QAL	0 QAL	
97058-09	2/27/1997	97058-09	soil	861946.125	432975.9375	0	2.24	0	2.24	0	2.24	3	0	0.1	1	0	comp	scrape in backfill @ pugmill area	0 QAL	0 QAL	
<hr/>																					
Avg. PCB Conc. (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. PCB Conc. (ppm)														
0.00	0.017	3.16	2.22	0.00	70.2%	29.8%	0.00														

**Group 17: Grids 107, 108, 115, 116**

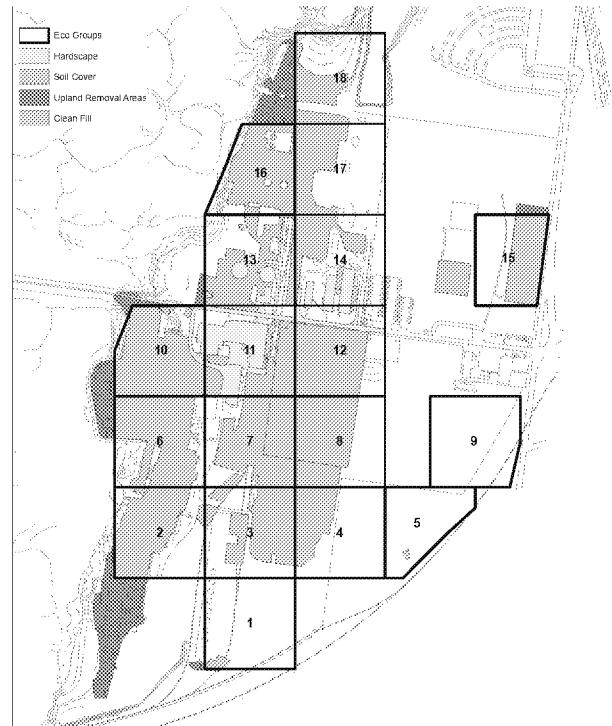
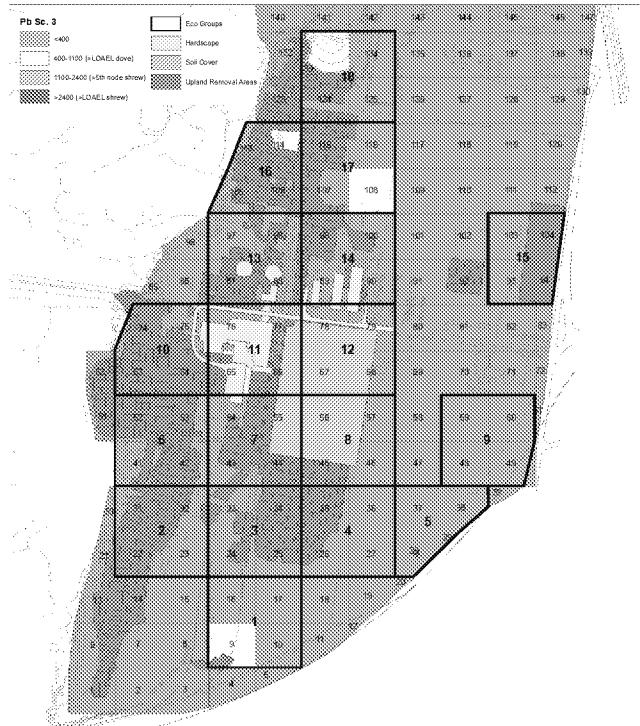
SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	AR1254_PPM	AR1254_DL	AR1260_PPM	AR1260_DL	AR1268_PPM	AR1268_DL	TOTAL_DETECTS	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
96213-14	7/31/1996	96213-14	soil	862039.125	432865.9375	0	2.31	0	2.31	0	2.31	3	0	0.1	0	0	comp	5-pt composite surface samples from roads at north side of site	0	QAL	
96213-15	7/31/1996	96213-15	soil	862396.125	433039.9063	0	2.07	0	2.07	0	2.07	3	0	0.1	0	0	comp	5-pt composite surface samples from roads at north side of site	0	QAL	
96213-16	7/31/1996	96213-16	soil	862346.125	432761.9063	0	4.18	0	4.18	0	4.18	3	0	0.1	0	0	comp	5-pt composite surface samples from roads at north side of site	0	QAL	
96260-05	9/16/1996	96260-05	soil	862285.1875	433148.9063	0	2.15	0	2.15	0	2.15	3	0	1	0	0	grab	brown sand with trace tan sand	0	QAL	
96260-07	9/16/1996	96260-07	soil	862383.625	433131.5625	0	2.24	0	2.24	0	2.24	3	0	1	0	0	grab	brown sand with debris (i.e., brick, ballast)	0	QAL	
96260-09	9/16/1996	96260-09	soil	862369.4375	433021.4375	0	2.09	0	2.09	0	2.09	3	0	1	0	0	grab	brown loamy sand with root debris	0	QAL	
96260-11	9/16/1996	96260-11	soil	862288.3125	433031.1875	0	2.22	0	2.22	0	2.22	3	0	1	0	0	grab	dark brown sand	0	QAL	
96260-13	9/16/1996	96260-13	soil	862233.3125	433039.9375	0	2.28	0	2.28	0	2.28	3	0	1	0	0	grab	tan sand with rust stains	0	QAL	
96260-15	9/16/1996	96260-15	soil	862352.375	432927.1563	0	2.21	0	2.21	0	2.21	3	0	1	0	0	grab	dark brown sand with loamy material	0	QAL	
96261-15	9/17/1996	96261-15	soil	862272.125	432960.0625	0	2.11	0	2.11	0	2.11	3	0	1	0	0	grab	brown loamy sand	0	QAL	
96261-18	9/17/1996	96261-18	soil	862214.5	432953.625	0	2.23	0	2.23	0	2.23	3	0	1	0	0	grab	brown sand with trace tan sand	0	QAL	
96261-20	9/17/1996	96261-20	soil	862343.8125	432825.1875	0	2.26	0	2.26	0	2.26	3	0	1	0	0	grab	dark brown loamy sand with root debris	0	QAL	
96262-10	9/18/1996	96262-10	soil	862043.125	432783.9375	0	2.14	0	2.14	0	2.14	3	0	1	0	0	grab	brown sand	0	QAL	
96263-01	9/19/1996	96263-01	soil	862279.125	432820.625	0	2.32	0	2.32	0	2.32	3	0	0.5	0	0	grab	dark brown loamy sand with root debris and whit/beige fibrous material	0	QAL	
96263-02	9/19/1996	96263-02	soil	862179.75	432828.3125	0	2.3	0	2.3	0	2.3	3	0	1	0	0	grab	light brown to tan sand	0	QAL	
96263-04	9/19/1996	96263-04	soil	862106	432877.3438	0	2.33	0	2.33	0	2.33	3	0	1	0	0	grab	light brown loamy sand	0	QAL	
96277-16	10/3/1996	96277-16	soil	862187.75	432754.4375	0	2.33	0	2.33	0	2.33	3	0	1	0	0	grab	brown sand	0	QAL	
96277-24	10/3/1996	96277-24	soil	862233.5625	433100.9688	0	2.24	0	2.24	0	2.24	3	0	1	0	0	grab	brown sand organic material	0	QAL	
96277-26	10/3/1996	96277-26	soil	862279.125	432835.625	0	2.54	0	2.54	0	2.54	3	0	1	0	0	grab	brn loamy sand white crumbly mat.	0	QAL	
96277-27	10/3/1996	96277-27	soil	862299.125	432820.625	0	2.78	0	2.78	0	2.78	3	0	1	0	0	grab	brn sand organic material	0	QAL	
96284-01	10/10/1996	96284-01	soil	862316.125	432822.9063	0	2.51	0	2.51	0	2.51	3	0	1	0	0	grab	brown to black sand, small stones, granular metal fragments	0	QAL	
96284-03	10/10/1996	96284-03	soil	862821.125	432865.9063	0	2.75	0	2.75	0	2.75	3	0	0.5	0	0	grab	brown wet sand, organic debris	0	QAL	
96284-08	10/10/1996	96284-08	soil	862172.125	432806.9375	0	2.44	0	2.44	0	2.44	3	0	1	0	0	grab	brown sand with organic material	0	QAL	
96304-01	10/30/1996	96304-01	soil	862065.125	432757.3438	0	2.27	0	2.27	0	2.27	3	0	1	0	0	grab	delineation hand auger sample	0	QAL	
96304-05	10/30/1996	96304-05	soil	862144.125	432784.9375	0	2.18	0	2.18	0	2.18	3	0	1	0	0	grab	delineation hand auger sample	0	QAL	
96304-06	10/30/1996	96304-06	soil	862192.125	432774.9375	0	2.2	0	2.2	0	2.2	3	0	1	0	0	grab	delineation hand auger sample	0	QAL	
96304-07	10/30/1996	96304-07	soil	862246.125	432784.9063	0	2.36	0	2.36	0	2.36	3	0	1	0	0	grab	delineation hand auger sample	0	QAL	
96319-NCA-04	11/14/1996	96319-NCA-04	soil	862125.875	433093.5938	0	2.48	0	2.48	0	2.48	3	0	1.5	2	0	comp	post excavation 3-pt south sidewall	0	QAL	
96319-NCA-05	11/14/1996	96319-NCA-05	soil	862240	433156.125	0	2.2	0	2.2	0	2.2	3	0	1.5	2	0	comp	post excavation 3-pt east sidewall	0	QAL	
97058-08	2/27/1997	97058-08	soil	861996.125	432943.9375	0	2.23	0	2.23	0	2.23	3	0	0.1	1	0	comp	scrape in backfill @ pugmill area	0	QAL	
97071-NCA-19	3/12/1997	97071-NCA-19	soil	862174.125	432791.9375	0	2.07	0	2.07	0	2.07	3	0	1	2	0	comp	post excavation N sidewall 3-pt	0	QAL	
97072-01	3/13/1997	97072-01	soil	862054.125	432929.9375	0	2.3	0	2.3	0	2.3	3	0	0.3	1	0	comp	scrape area 5-pt	0	QAL	
97072-02	3/13/1997	97072-02	soil	862054.125	432791.9375	0	2.1	0	2.1	0	2.1	3	0	0.3	1	0	comp	scrape area 5-pt	0	QAL	
97076-NCA-25	3/17/1997	97076-NCA-25	soil	862104.4375	432761.125	0	2.19	0	2.19	0	2.19	3	0.5	1	1	0	comp	post excavation 5-pt bottom	0	QAL	
97128-02	5/8/1997	97128-02	soil	862350.125	432803.9063	0	2.08	0	2.08	0	2.08	3	0	0.1	0	0	comp	road sample 5-pt	0	QAL	
97128-03	5/8/1997	97128-03	soil	862376.125	433013.9063	0	2.38	0	2.38	0	2.38	3	0	0.1	0	0	comp	road sample 5-pt	0	QAL	
97128-04	5/8/1997	97128-04	soil	862396.125	433169.9063	0	2.01	0	2.01	0	2.01	3	0	0.1	0	0	comp	road sample 5-pt	0	QAL	

Avg. PCB Conc. (ppm)	Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. PCB Conc. (ppm)
0.00	0.017	4.00	1.52	0.00	38.1%	61.9%	0.00

**Group 18: Grids 124, 125, 133, 134**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	AR1254_PPM	AR1254_DL	AR1260_PPM	AR1260_DL	AR1268_PPM	AR1268_DL	TOTAL_DETECTS	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
96242-07	8/29/1996	96242-07	soil	862045.125	433535.9375	0	3.56	0	3.56	0	3.56	9	0	1	0	0	grab	brown sand, grey flakes	0	QAL	
96242-08	8/29/1996	96242-08	soil	862024.125	433478.9375	0	3.55	0	3.55	0	3.55	9	0	1	0	0	grab	brown sand, organic debris	0	QAL	
96242-09	8/29/1996	96242-09	soil	862015.125	433461.9375	0	2.7	0	2.7	0	2.7	5	0	1	0	0	grab	brown sand, petroleum odor	0	QAL	
96277-18	10/3/1996	96277-18	soil	862221.1875	433229.4063	0	2.21	0	2.21	0	2.21	5	0	1	0	0	grab	brown sand trace clinker	0	QAL	
96277-20	10/3/1996	96277-20	soil	862251.1875	433229.375	0	2.23	0	2.23	0	2.23	5	0	1	0	0	grab	brown sand loamy	0	QAL	
96296-08	10/22/1996	96296-08	soil	862220.125	433288.9063	0	2.25	0	2.25	0	2.25	5	0	1	0	0	grab	delineation sample	0	QAL	
96296-10	10/22/1996	96296-10	soil	862223.125	433337.9063	0	2.29	0	2.29	0	2.29	5	0	1	0	0	grab	delineation sample	0	QAL	
96298-01	10/24/1996	96298-01	soil	862191.125	433271.9375	0	2.18	0	2.18	0	2.18	5	0	1	0	0	grab	delineation sample	0	QAL	
96312-10	11/7/1996	96312-10	soil	862164.125	433235.9375	0	2.29	0	2.29	0	2.29	5	0	1	0	0	grab	brown sand with black hard material	0	QAL	
96312-12	11/7/1996	96312-12	soil	862080.125	433247.9375	0	2.39	0	2.39	0	2.39	5	0	1	0	0	grab	brown sand with black hard material	0	QAL	
96319-NCA-06	11/14/1996	96319-NCA-06	soil	862227.0625	433205.0313	0	2.15	0	2.15	0	2.15	5	0	1.25	2	0	comp	post excavation 3-pt north sidewall	0	QAL	

Most Common		Backfill/Soil		Incomplete		Ecological		Weighted Avg.	
Avg. PCB Conc. (ppm)	Detection Limit (ppm)	Grid Cell Area (ac)	Cover Area (ac)	Portion of Hardscape (ac)	Exposure Area (ac)	Exposure Area (ac)	PCB Conc. (ppm)		
0.00	0.017	3.28	1.07	0.00	32.8%	67.2%	0.00		



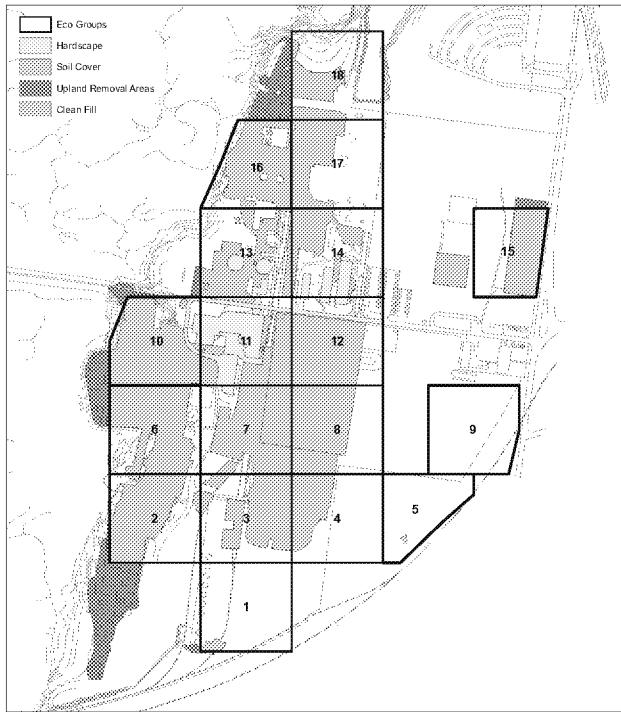
**Lead**

Group	Grids	Total Pb Adjusted for Backfill (mg/kg)	Total Pb Further Adjusted for Hardscape (mg/kg)
1	9,10,16,17	346	346
2	22,23,31,32	87	87
3	24,25,33,34	103	103
4	26,27,35,36	38	38
5	28,29,37,38	84	84
6	41,42,52,53	48	48
7	43,44,54,55	42	40
8	45,46,56,57	17	17
9	48,49,59,60	34	34
10	63,64,74,75	71	54
11	65,66,76,77	87	29
12	67,68,78,79	63	60
13	87,88,97,98	106	93
14	89,90,99,100	139	106
15	93,94,103,104	45	45
16	105,106,113,114	162	162
17	107,108,115,116	223	223
18	124,125,133,134	272	272

Notes:

Exceeds 400 mg/kg (>LOAEL dove)

Group	Grids	Area (ac)	Clean Fill/Cover (ac)	Hardscape (ac)
1	9,10,16,17	4.00	0.11	0.00
2	22,23,31,32	4.00	2.22	0.00
3	24,25,33,34	4.00	2.15	0.00
4	26,27,35,36	4.00	1.19	0.00
5	28,29,37,38	2.74	0.02	0.00
6	41,42,52,53	4.00	2.80	0.00
7	43,44,54,55	4.00	2.85	0.05
8	45,46,56,57	4.00	2.40	0.00
9	48,49,59,60	3.89	0.00	0.00
10	63,64,74,75	3.81	2.92	0.24
11	65,66,76,77	4.00	1.60	1.72
12	67,68,78,79	4.00	2.35	0.11
13	87,88,97,98	4.00	1.74	0.29
14	89,90,99,100	4.00	1.21	0.70
15	93,94,103,104	3.01	1.52	0.00
16	105,106,113,114	3.16	1.07	0.00
17	107,108,115,116	4.00	0.00	0.00
18	124,125,133,134	3.28	0.00	0.00



Group No.	Area (ac)	Grids	COC
1	4.0	9,10,16,17	Pb
2	4.0	22,23,31,32	Ar1268, Hg
3	4.0	24,25,33,34	Ar1268, Hg
4	4.0	26,27,35,36	Hg
5	2.7	28,29,37,38	Hg
6	4.0	41,42,52,53	Ar1268, Hg
7	4.0	43,44,54,55	Ar1268, Hg
8	4.0	45,46,56,57	Ar1268, Hg
9	3.9	48,49,58,59	Hg
10	3.8	63,64,74,75	Ar1268, Hg
11	4.0	65,66,76,77	Ar1268, Hg, Pb
12	4.0	67,68,78,79	Ar1268, Hg
13	4.0	87,88,97,98	Ar1268
14	4.0	89,90,99,100	Ar1268, Hg
15	3.0	93,94,103,104	Hg
16	3.2	105,106,113,114	Pb
17	4.0	107,108,115,116	Hg, Pb
18	3.3	124,125,133,134	Pb

#### Clean Fill/Soil Cover

FID	Shape *	Area (ac)	Group	Area SUM (ac)
40	Polygon	0.514984	N/A	
43	Polygon	0.110631	1	0.11
25	Polygon	0.066022	2	
26	Polygon	2.123541	2	
27	Polygon	0.022086	2	
28	Polygon	0.009739	2	2.22
13	Polygon	0.109607	3	
21	Polygon	1.556586	3	
23	Polygon	0.395991	3	
24	Polygon	0.090122	3	2.15
20	Polygon	1.192803	4	1.19
22	Polygon	0.018485	5	0.02
29	Polygon	2.802358	6	2.80
12	Polygon	0.090999	7	
14	Polygon	1.949515	7	
18	Polygon	0.805872	7	2.85
15	Polygon	0.52521	8	
19	Polygon	1.875249	8	2.40
32	Polygon	0.026238	10	
34	Polygon	0.026898	10	
35	Polygon	2.8276	10	
36	Polygon	0.009222	10	
37	Polygon	0.031375	10	2.92
9	Polygon	0.066821	11	
10	Polygon	0.094771	11	
11	Polygon	0.37119	11	
16	Polygon	0.654591	11	
30	Polygon	0.010589	11	
31	Polygon	0.083283	11	
33	Polygon	0.090542	11	
38	Polygon	0.223645	11	1.60
7	Polygon	0.009611	12	
8	Polygon	0.006964	12	
17	Polygon	2.328606	12	2.35
0	Polygon	1.531813	13	
4	Polygon	0.199083	13	
2	Polygon	0.013537	13	1.74
3	Polygon	1.096109	14	
5	Polygon	0.064366	14	
6	Polygon	0.047415	14	1.21
39	Polygon	1.377055	15	1.38
41	Polygon	2.217089	16	2.22
1	Polygon	1.524481	17	1.52
42	Polygon	1.074579	18	1.07

#### Hardscape

FID	Shape *	Area (ac)	Group	Area SUM (ac)
19	Polygon	0.047824	7	0.05
5	Polygon	0.09217	10	
6	Polygon	0.076771	10	
7	Polygon	0.056332	10	
8	Polygon	0.011886	10	0.24
4	Polygon	0.902412	11	
9	Polygon	0.184555	11	
16	Polygon	0.024732	11	
18	Polygon	0.327395	11	
22	Polygon	0.022551	11	
23	Polygon	0.257919	11	1.72
1	Polygon	0.010023	12	
3	Polygon	0.026239	12	
13	Polygon	0.044343	12	
17	Polygon	0.032709	12	0.11
14	Polygon	0.080127	13	
15	Polygon	0.004257	13	
20	Polygon	0.103819	13	
21	Polygon	0.100822	13	0.29
0	Polygon	0.090558	14	
2	Polygon	0.144308	14	
10	Polygon	0.029547	14	
11	Polygon	0.217217	14	
12	Polygon	0.214901	14	0.70

**Group 1: Grids 9, 10, 16, 17**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_1
08101-AC-1	4/10/2008	AC-1	soil	861867.625	430726.75	Lead	31.6	0.01999	31.6	0	0.5	0	0	grab	Upland 2008 Sampling Event	0	CAS	metal	
08101-PB-2	4/10/2008	PB-2	soil	861620.875	430809.8125	Lead	443	0.01999	443	0	0.5	0	0	grab	Upland 2008 Sampling Event	0	CAS	metal	
08102-AC-1-C	4/11/2008	AC-1	soil	861867.625	430726.75	Lead	102	0.01999	102	0	0.5	0	0	composite	Upland 2008 Sampling Event	0	CAS	metal	
08102-PB-2-C	4/11/2008	PB-2	soil	861620.875	430809.8125	Lead	181	0.01999	181	0	0.5	0	0	composite	Upland 2008 Sampling Event	0	CAS	metal	
950039-15	2/8/1995	950039-15	soil	861765.0625	431051.9375	Lead	155	3.45	155	0	1	0	0	grab	Proposed Containment Cell Area	0	Eco	metal	
950235-OST-31	8/23/1995	OST-31	soil	861606.0625	430883.9375	Lead	27.8	0.63999	27.8	0	1	0	0	grab	W. Side OST Area	0	Pac	metal	
96253-15	9/9/1996	96253-15	soil	861660.0625	430670.9375	Lead	364	11	364	0	1	0	0	grab	brown sand	0	QAL	metal	
96253-18	9/9/1996	96253-18	soil	861631.0625	430726.9375	Lead	285	10.8	285	0	1	0	0	grab	tan to brown sand	0	QAL	metal	
96253-19	9/9/1996	96253-19	soil	861668.0625	430721.9375	Lead	307	11.7	307	0	1	0	0	grab	brown sand	0	QAL	metal	
96254-01	9/10/1996	96254-01	soil	861671.0625	430816.9375	Lead	980	10.3	980	0	1	0	0	grab	brown sand	0	QAL	metal	
96254-02	9/10/1996	96254-02	soil	861621.0625	430815.9375	Lead	455	12.2	455	0	1	0	0	grab	dark brown to light brown sand	0	QAL	metal	
96254-03	9/10/1996	96254-03	soil	861598.0625	430762.9375	Lead	109	10.8	109	0	1	0	0	grab	brown sand with small pieces of hard bl	0	QAL	metal	
96255-21	9/11/1996	96255-21	soil	861679.0625	431048.9375	Lead	77.1	12	77.1	0	1	0	0	grab	tan sand with traces of rust material	0	QAL	metal	
96255-23	9/11/1996	96255-23	soil	861679.0625	430948.9375	Lead	75.2	10.7	75.2	0	1	0	0	grab	brown sand with some root mass	0	QAL	metal	
96260-OST-13	9/16/1996	96260-OST-13	soil	861591.75	430698.375	Lead	635	11.4	635	0	1.3	2	0	comp	post excavation, 3-pt composite, brown	0	QAL	metal	
96260-OST-14	9/16/1996	96260-OST-14	soil	861623.125	430696.75	Lead	252	11.6	252	0	1.3	2	0	comp	post excavation, 3-pt composite, brown	0	QAL	metal	
96262-20	9/18/1996	96262-20	soil	861577.0625	430693.9375	Lead	820	10.6	820	0	0.1	0	0	grab	brown silty sand, surface grab east of sc	0	QAL	metal	
97140-04	5/20/1997	97140-04	soil	861711.0625	430672.9375	Lead	22.2	10.3	22.2	0	0.1	0	0	comp	limestone road surface sample 5-pt	0	QAL	metal	
97140-05	5/20/1997	97140-05	soil	861742.0625	431013.9375	Lead	48.3	10.3	48.3	0	0.1	0	0	comp	limestone road surface sample 5-pt	0	QAL	metal	
98267-CRR-D-07	9/24/1998	98267-CRR-D-07	soil	861651.0625	430720.9375	Lead	690	0.54	690	0	1	0	0	grab	railroad area "D"	0	Sav	metal	
98274-CRR-D-08	10/1/1998	98274-CRR-D-08	soil	861673.0625	430663.9375	Lead	700	0.56	700	0	1	2	0	comp	railroad area "D"	0	Sav	metal	
LC-634-SLA	12/1/1994	LC-634	soil	861639.0625	431026.9375	Lead	1100	0	1100	0	1	0	0	comp	railroad area "D"	0	ESD	metal	
LC-635-SLA	12/1/1994	LC-635	soil	861622.0625	430806.9375	Lead	320	0	320	0	1	0	0	comp	railroad area "D"	0	ESD	metal	

Avg. Pb Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Pb Concentration (ppm)
356	11.3	4.00	0.11	0.00	2.8%	97.2%	346

**Group 2: Grids 22, 23, 31, 32**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5OL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPUNG_E	DUP_LAB	TYPE_L
09129-SL3-0-2	5/9/2009	SL-3	soil	861565.625	431287.3125	Lead	29.8	0.05	29.8	0	2	0	0	0 grab		May 2009 Upland Soil Sampling	0 CAS		
96214-01	8/1/1996	96214-01	soil	861529.0625	431248.9375	Lead	60.1	10.5	86.1	0	1	0	0	0 grab	Phase IIIC Characterization samples		0 QAL		
96214-03	8/1/1996	96214-03	soil	861429.0625	431148.9375	Lead	255	10.3	255	0	1	0	0	0 grab	Phase IIIC Characterization samples		0 QAL		
96214-05	8/1/1996	96214-05	soil	861529.0625	431148.9375	Lead	260	10.7	265	0	1	0	0	0 grab	Phase IIIC Characterization samples		0 QAL		
97086-SRA-102	3/27/1997	97086-SRA-102	soil	861263.25	431447.4375	Lead	638	11.6	638	0	2	2	0	0 comp	post excavation 3-pt N sidewall		0 QAL		
97097-SRA-121	4/7/1997	97097-SRA-121	soil	861185.25	431344.3438	Lead	194	11.1	194	0	1	2	0	0 comp	post excavation 3-pt W sidewall		0 QAL		
97107-BM4-19	4/17/1997	97107-BM4-19	soil	861489.75	431419.8438	Lead	330	11.4	330	0	1.5	2	0	0 comp	post excavation E sidewall 3-pt		0 QAL		
97125-BM3-09	5/5/1997	97125-BM3-09	soil	861395.5625	431268.3438	Lead	45.8	10.3	45.8	0.5	0.5	1	0	0 comp	post excavation 5-pt bottom		0 QAL		
97135-03	5/15/1997	97135-03	soil	861536.0625	431413.9375	Lead	43	10.4	43	0	0.1	0	0	0 comp	road surface sample 5-pt		0 QAL		
97135-04	5/15/1997	97135-04	soil	861484.0625	431287.9375	Lead	28.5	10.4	28.5	0	0.1	0	0	0 comp	road surface sample 5-pt		0 QAL		

Avg. Pb Concentration	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Pb Concentration (ppm)
188	11.3	4.00	2.22	0.00	55.5%	44.5%	86.9

Group 3: Grids 24, 25, 33, 34

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_I
08101-AC-2	4/10/2008	AC-2	soil	861641.75	431449.75	Lead	8.77	0.01999	8.77		0	0.5	0	0	0 grab		Upland 2008 Sampling Event	0	CAS	
08102-AC-2-C	4/11/2008	AC-2	soil	861641.75	431449.75	Lead	8.29	0.01999	8.29		0	0.5	0	0	0 composite		Upland 2008 Sampling Event	0	CAS	
94208-10	7/27/1994	94208-10	soil	861771.0625	431479.9375	Lead	205	1.81	205		0	1	0	0	0 comp	2nd most S			O Eco	
96169-M50	6/17/1996	96169-M50	soil	861990.25	431163.125	Lead	0	10.7	0		0.5	1	1	0	0 comp	post excavation bottom 5-pt			O QAL	
96253-01	9/9/1996	96253-01	soil	861715.0625	431121.9375	Lead	280	10.9	280		0	1	0	0	0 grab	Dark brown to grey sand			O QAL	
96253-04	9/9/1996	96253-04	soil	861732.0625	431253.9375	Lead	494	11.3	494		0	1	0	0	0 grab	dark to light brown sand			O QAL	
96253-07	9/9/1996	96253-07	soil	861678.0625	431123.9375	Lead	177	10.9	177		0	1	0	0	0 grab	brown to tan sand			O QAL	
96253-10	9/9/1996	96253-10	soil	861697.0625	431259.9375	Lead	72.2	11.5	72.2		0	1	0	0	0 grab	tan sand			O QAL	
96253-13	9/9/1996	96253-13	soil	861615.0625	431313.9375	Lead	234	14.1	234		0	1	0	0	0 grab	brown to tan sand, wet			O QAL	
96253-14	9/9/1996	96253-14	soil	861620.0625	431355.9375	Lead	547	13.4	547		0	1	0	0	0 grab	brown to tan sand, wet			O QAL	
96256-01	9/12/1996	96256-01	soil	861629.0625	431148.9375	Lead	46.2	11.7	46.2		0	1	0	0	0 grab	tan sand with trace amount of roots			O QAL	
96256-03	9/12/1996	96256-03	soil	861629.0625	431248.9375	Lead	364	11.2	364		0	1	0	0	0 grab	brown to tan sand			O QAL	
96260-01	9/16/1996	96260-01	soil	861648.0625	431173.9375	Lead	124	11	124		0	1	0	0	0 grab	light brown to tan very fine sand			O QAL	
96260-02	9/16/1996	96260-02	soil	861654.0625	431257.9375	Lead	295	12.1	295		0	1	0	0	0 grab	brown to grey sand with some dark stain			O QAL	
97121-OST-18	5/1/1997	97121-OST-18	soil	861685.0625	431146.9375	Lead	149	11.5	149		0	1.5	2	0	0 comp	post excavation S sidewall 3-pt			O QAL	
97121-OST-19	5/1/1997	97121-OST-19	soil	861674.0625	431190.9375	Lead	297	10.8	297		0	1.5	2	0	0 comp	post excavation W sidewall 3-pt			O QAL	
97121-OST-21	5/1/1997	97121-OST-21	soil	861693.0625	431237.9375	Lead	420	11.4	420		0	1.5	2	0	0 comp	post excavation N sidewall 3-pt			O QAL	
97122-OST-26	5/2/1997	97122-OST-26	soil	861703.0625	431277.9375	Lead	265	11.4	265		0	1.5	2	0	0 comp	post excavation S sidewall 3-pt			O QAL	
97122-OST-27	5/2/1997	97122-OST-27	soil	861691.0625	431325.9375	Lead	390	11	390		0	1.25	2	0	0 comp	post excavation W sidewall 3-pt			O QAL	
97122-OST-29	5/2/1997	97122-OST-29	soil	861721.1875	431382.25	Lead	102	11.3	102		0	1.5	2	0	0 comp	post excavation N sidewall 3-pt			O QAL	
97170-M108	6/19/1997	97170-M108	soil	861821.0625	431365.9375	Lead	75	5.4	75		0	1.5	2	0	0 comp	Post excavation South sidewall 3-point			O Sav	
98264-CRR-B-01	9/21/1998	98264-CRR-B-0	soil	861764.0625	431373.9375	Lead	36	0.55	36		0	1.5	2	0	0 comp	railroad area "B" post exc.			O Sav	
98264-CRR-B-02	9/21/1998	98264-CRR-B-0	soil	861772.0625	431323.9375	Lead	27	0.56999	27		0	1.5	2	0	0 comp	railroad area "B" post exc.			O Sav	
98264-CRR-C-02	9/21/1998	98264-CRR-C-0	soil	861759.0625	431188.9375	Lead	83	0.58999	83		0	1.5	2	0	0 comp	railroad area "C" post exc.			O Sav	
98264-CRR-C-03	9/21/1998	98264-CRR-C-0	soil	861741.0625	431142.9375	Lead	710	0.57999	710		0	1	2	0	0 comp	railroad area "C" post exc.			O Sav	

Avg. Pb Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Incomplete Portion of Hardscape (ac)	Ecological Exposure Area (ac)	Exposure Area (ac)	Weighted Avg. Pb Concentration (ppm)
217	11.3	4.00	2.15	0.00	53.8%	46.2%	103

**Group 4: 26, 27, 35, 36**

SAMPLE_ID	DATE_SAMPLE	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	Result_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_1
08101-HG-2	4/10/2008	HG-2	soil	862001.1875	431132.6875	Lead	3.7	0.01999	3.7	0	0.5	0	0	0	grab	Upland 2008 Sampling Event	0	CAS		
08102-HG-2-C	4/11/2008	HG-2	soil	862001.1875	431132.6875	Lead	32.3	0.01999	32.3	0	0.5	0	0	0	composite	Upland 2008 Sampling Event	0	CAS		
94344-14	12/10/1994	94344-14	soil	862025.5625	431089.3438	Lead	7.22	1.64	7.22	0	1	0	0	0	grab	Proposed Containment Cell Area	0	Eco		
LC-621-SLA	12/1/1994	LC-621	soil	862323.0625	431375.9375	Lead	86	0	86	0	1	0	0	0	comp		0	ESD		
LC-622-SLA	12/1/1994	LC-622	soil	862296.0625	431111.9375	Lead	130	0	130	0	1	0	0	0	comp		0	ESD		

Avg. Pb Concentration	Most Common Detection Limit	Grid Cell Area (ac)	Portion of Backfill/Soil Hardscape	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Pb Concentration (ppm)
51.8	11.3	4.00	1.19	0.00	29.8%	70.2%

Group 5: 28, 29, 37, 38

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT	0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_1
96331-RI-13	11/27/1996	96331-RI-13	soil	862813.563	431491.4063	Lead	28.2	11.3	28.2		0	1	0	0	0 comp/grab	brown & gray loamy sand	0 QAL				
LC-620-SLA	12/1/1994	LC-620	soil	862546.063	431308.9063	Lead	140	0	0	3.40		0	1	0	0	0 comp		0 ESD			
<hr/>																					
Avg. Pb Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Pb Concentration (ppm)														
84.1	0.57	2.74	0.02	0.00	0.7%	99.3%	83.5														

**Group 6: 41, 42, 52, 53**

SAMPLE_ID	DATE_SAMPLE	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_J
09129-SL13-0-2	5/9/2009 SL-13		soil	861561.25	431791.0313	Lead	118	0.03999	3.83		0	2	0	0	0 grab		May 2009 Up!	0	CAS	
09130-SL9-0-2	5/10/2009 SL-9		soil	861241.375	431584.8125	Lead	3.43	0.05	3.43		0	2	0	0	0 grab		May 2009 Up!	0	CAS	
97104-02	4/14/1997 97104-02		soil	861347.0625	431614.9375	Lead	60.7	11.4	6.7		0	0.1	0	0	0 comp	area of drum sump W BMI		0	QAL	
97111-BM4-26	4/21/1997 97111-BM4-26		soil	861524.5625	431565.4375	Lead	253	11.3	2.3		0	2	2	0	0 comp	post excavation E sidewall		0	QAL	
97114-BM4-31	4/24/1997 97114-BM4-31		soil	861514	431621.8438	Lead	49.6	11.5	4.8		0.1	0.1	1	0	0 comp	post excavation bottom 5-		0	QAL	
LC-204-SLA	10/17/1994 LC-204		soil	861568.0625	431896.9375	Lead	390	0	0		0	1	0	0	0 comp			0	ESD	

Avg. Pb Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Pb Concentration (ppm)
146	11.3	4.00	2.80	0.00	70.1%	29.9%	47.6

**Group 7: 43, 44, 54, 55**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_1
96207-M76	7/25/1996	96207-M76	soil	861991.5625	431618.5313	Lead	323	12.7	32.3		0	1	2	0	comp	post excavation north side		0	QAL	
96261-01	9/17/1996	96261-01	soil	861788.0625	431612.9375	Lead	110	11.7	33.0		0	1	0	0	grab	dark brown sand with blac		0	QAL	
96298-SRY-24	10/24/1996	96298-SRY-24	soil	861827.875	431864.625	Lead	69.9	11.8	69.4		0	2	2	0	comp	post excavation east sidew		0	QAL	
97086-CTA-03	3/27/1997	97086-CTA-03	soil	861740.0625	431718.9375	Lead	119	11.9	33.9		0	2	2	0	comp	post excavation 3-pt S side		0	QAL	
97135-02	5/15/1997	97135-02	soil	861576.0625	431553.9375	Lead	35	10.6	35.0		0	0.1	0	0	comp	road surface sample 5-pt		0	QAL	

*Including Hardscape*

Avg. Pb Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Pb Concentration {ppm}
131	11.3	4.00	2.85	0.05	72.4%	27.6%	40.4

*Excluding Hardscape*

Avg. Pb Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Pb Concentration {ppm}
131	11.3	4.00	2.85	0.00	71.2%	28.8%	41.9

**Group 8: 45, 46, 56, 57**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_QSDL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_1
09129-SL21-0-2	5/9/2009	SL-21	soil	862315.8125	431633.3438	Lead	20.4	0.05999	20.4	0	2	0	0	0 grab		May 2009 Upland Soil Sampling	0	CAS		
97042-03	2/11/1997	97042-03	soil	862302.0625	431865.9063	Lead	48.7		11.3	48.7	0	1	0	0	0 grab	characterization east of cell buildings		0	QAL	
97042-06	2/11/1997	97042-06	soil	862286.0625	431767.9375	Lead	65.3		11.8	65.3	0	1	0	0	0 grab	characterization east of cell buildings		0	QAL	
08217-CS10-0.5	8/4/2008	CS10	Soil	862336.5625	431688.9375	Aroclor-1268	4.1		0.017	8.1	0	0.5	0	0	0 grab		Conf. PCB Upland Soil 2008	0	CAS	PCB

*Including Hardscape*

Avg. Pb Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Pb Concentration (ppm)
34.6	11.3	4.00	2.40	0.00	60.0%	40.0%	17.2

**Group 9: Grids 48, 49, 48, 59, 60**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	Result_0.5DL	R_MOD	D1	D2	POS	REMOVE	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB	TYPE_1
96331-RI-11	11/27/1996	96331-RI-11	soil	862938.563	431616.4063	Lead	14.9	11.9	11.9		0	1	0	0	comp/grab	brown & gray loamy sand	0 QAL		
LC-616-SLA	12/1/1994	LC-616	soil	862954.063	431887.9063	Lead	85	0	0		0	1	0	0	comp		0 ESD		
LC-617-SLA	12/1/1994	LC-617	soil	862698.063	431750.9063	Lead	0	3	3		0	1	0	0	comp		0 ESD		
<hr/>																			
Avg. Pb Concentration	Most Common Detection Limit	Grid Cell Area	Backfill/Soil Cover Area	Portion of Hardscape	Incomplete Cover Area	Ecological Exposure Area	Weighted Avg. Pb Concentration												
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	(ac)	(ppm)												
33.8	11.3	3.89	0.00	0.00	0.0%	100.0%	33.8												

**Group 10: Grids 63, 64, 74, 75**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_D_SDL	R_MOD	D1	D2	POS	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_1
08129-SL24-0-2	5/9/2009	SL-24	soil	861395.625	432256.375	Lead	4.12	0.05	4.12		0	2	0	0	grab		May 2009 Upland Soil Sampling	0	4	
96260-19	9/16/1996	96260-19	soil	861535.125	432233.9375	Lead	244	11.4	244		0	1	0	0	grab	brown to tan sand		0	4	
96283-CPS-01	10/9/1996	96283-CPS-0	soil	861568.0625	432097.9375	Lead	484	12.8	484		0.5	1	1	0	comp	post excavation, 5-pt composite		0	4	
96290-CPS-07	10/16/1996	96290-CPS-0	soil	861537.0625	432109.9375	Lead	320	11.8	320		0.5	1	1	0	comp	post excavation (bottom), 3-pt composite		0	4	
96290-CPS-08	10/16/1996	96290-CPS-0	soil	861543.0625	432117.9375	Lead	382	12	382		0	0.8	2	0	comp	post excavation (n. sidewall), 3-pt composite		0	4	

*Including Hardscape*

Avg. Pb Concentration	Most Common Detection Limit	Grid Cell Area	Backfill/Soil Cover Area	Portion of Hardscape	Incomplete Exposure Area	Ecological Exposure Area	Weighted Avg. Pb Concentration
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	(ac)	(ppm)
287	11.3	3.81	2.92	0.24	82.8%	17.2%	53.9

*Excluding Hardscape*

Avg. Pb Concentration	Most Common Detection Limit	Grid Cell Area	Backfill/Soil Cover Area	Portion of Hardscape	Incomplete Exposure Area	Ecological Exposure Area	Weighted Avg. Pb Concentration
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	(ac)	(ppm)
287	11.3	3.81	2.92	0.00	76.6%	23.4%	71.4

**Group 11: Grids 65, 66, 76, 77**

SAMPLE_ID	DATE_SAMPLE	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_1
94208-06	7/27/1994	94208-06	soil	861937.125	432303.9375	Lead	163	1.81	163	U	0	1	0	0	comp	just N of E-W road	0	Eco	metal	
96247-16	9/3/1996	96247-16	soil	861969.125	432326.9375	Lead	0	10.8	5.4	U	0	1	0	0	grab	light brown to grey sand	0	QAL	metal	
96261-CSA-01	9/17/1996	96261-CSA-0	soil	861799.5	432003.25	Lead	243	12	24.9	U	0.5	0.5	1	0	comp	post excavation, 4-pt composite from sump	0	QAL	metal	
96262-CSA-02	9/18/1996	96262-CSA-0	soil	861791.0625	431957.9375	Lead	175	12	17.5	U	0.5	0.8	1	0	comp	post excavation, 5-pt composite, grey/brown s	0	QAL	metal	
96270-sry-09	9/26/1996	96270-SRY-0	soil	861868.6875	431973.0625	Lead	18.8	11.8	18.8	U	0	1.5	1	0	comp	post excavation bottom 5-pt	0	QAL	metal	
96284-CPS-02	10/10/1996	96284-CPS-0	soil	861612.0625	432088.9375	Lead	375	11.9	37.5	U	0.5	1	1	0	comp	post excavation (bottom), 5-pt composite, brc	0	QAL	metal	
96317-SRY-40	11/12/1996	96317-SRY-4	soil	861885.5625	432246.125	Lead	125	11.4	12.5	U	0	1.3	2	0	comp	post excavation 3-pt north sidewall	0	QAL	metal	
GPT-00-1	3/23/1995	GPT-00	soil	861938.125	432297.625	Lead	119	0	11.9	U	0	2	0	0	grab		0	Sav	metal	
GPT-01-1	3/23/1995	GPT-01	soil	861913.25	432300.8438	Lead	128	0	12.8	U	0	2	0	0	grab		0	Sav	metal	
GPT-02-1	3/23/1995	GPT-02	soil	861884.25	432305.4063	Lead	65	0	6.5	U	0	2	0	0	grab		0	Sav	metal	

*Including Hardscape*

Avg. Pb Concentration	Most Common Detection Limit	Grid Cell Area	Backfill/Soil Cover Area	Portion of Hardscape	Incomplete Exposure Area	Ecological Exposure Area	Weighted Avg. Pb Concentration
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	(ac)	(ppm)
142	11.3	4.00	1.60	1.72	82.9%	17.1%	29.0

*Excluding Hardscape*

Avg. Pb Concentration	Most Common Detection Limit	Grid Cell Area	Backfill/Soil Cover Area	Portion of Hardscape	Incomplete Exposure Area	Ecological Exposure Area	Weighted Avg. Pb Concentration
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	(ac)	(ppm)
142	11.3	4.00	1.60	0.00	39.9%	60.1%	87.4

**Group 12: Grids 67, 68, 78, 79**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_1
97034-01	2/3/1997	97034-01	soil	862228.125	432283.9375	Lead	145	11.8	14.3		0	1	0	0	grab	characterization south side boiler house	0 QAL			
97034-03	2/3/1997	97034-03	soil	862164.125	432283.9375	Lead	116	12	11.6		0	1	0	0	grab	characterization south side boiler house	0 QAL			
97034-05	2/3/1997	97034-05	soil	862112.125	432333.9375	Lead	281	11.5	28.1		0	1	0	0	grab	characterization west side boiler house	0 QAL			
97036-01	2/5/1997	97036-01	soil	862266.125	432329.9063	Lead	116	11.9	11.6		0	1	0	0	grab	characterization east side boiler house	0 QAL			
97042-01	2/11/1997	97042-01	soil	862318.0625	431967.9063	Lead	69.4	11.3	69.4		0	1	0	0	grab	characterization east of cell buildings	0 QAL			

*Including Hardscape*

Avg. Pb Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Pb Concentration (ppm)
145	11.3	4.00	2.35	0.11	61.5%	38.5%	59.5

*Excluding Hardscape*

Avg. Pb Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Pb Concentration (ppm)
145	11.3	4.00	2.35	0.00	58.6%	41.4%	63.5

## Group 13: 87, 88, 97, 98

SAMPLE_ID	DATE_SAMPLE	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POS	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP_LAB	TYPE_1
09129-SL26-0-2	5/9/2009	SL-26	soil	861897.75	432398.0313	Lead	3.71	0.05	1.85	0	0	0	0	0	0 grab	3rd N most	May 2009 Upland Soil Sampling	O CAS	
94208-05	7/27/1994	94208-05	soil	861965.125	432510.9375	Lead	326	1.81	5.78	0	1	0	0	0	0 grab	hand auger boring samples south of north removal area	O Eco	O DAL	
96207-01	7/25/1996	96207-01	soil	861741.125	432748.9375	Lead	165	12.1	1.95	0	1	0	0	0	0 grab	hand auger boring samples south of north removal area	O DAL	O DAL	
96207-04	7/25/1996	96207-04	soil	861741.125	432675.9375	Lead	34.7	12	3.42	0	1	0	0	0	0 grab	hand auger boring samples south of north removal area	O DAL	O DAL	
96207-06	7/25/1996	96207-06	soil	861691.125	432649.9375	Lead	204	12.8	2.56	0	1	0	0	0	0 grab	hand auger boring samples south of north removal area	O DAL	O DAL	
96207-07	7/25/1996	96207-07	soil	861691.125	432698.9375	Lead	74.3	15.8	7.45	0	1	0	0	0	0 grab	hand auger boring samples south of north removal area	O DAL	O DAL	
96207-09	7/25/1996	96207-09	soil	861691.125	432749.9375	Lead	0	11.9	3.29	U	0	1	0	0	0 grab	hand auger boring samples south of north removal area	O DAL	O DAL	
96207-10	7/25/1996	96207-10	soil	861691.125	432748.9375	Lead	61.5	13.8	8.2	0	1	0	0	0	0 grab	hand auger boring samples south of north removal area	O DAL	O DAL	
96227-01	9/14/1996	96227-01	soil	861906.125	432579.9375	Lead	994	11	9.84	0	1	0	0	0	0 grab	brown to light gray sand	O DAL	O DAL	
96227-03	9/14/1996	96227-03	soil	861891.125	432583.9375	Lead	289	10.2	2.98	0	1	0	0	0	0 grab	brown sand	O DAL	O DAL	
96239-01	8/26/1996	96239-01	soil	861819.125	432588.9375	Lead	150	10.5	3.70	0	1	0	0	0	0 grab	tan sand	O DAL	O DAL	
96239-04	8/26/1996	96239-04	soil	861784.125	432598.9375	Lead	64.4	10.6	6.21	0	1	0	0	0	0 grab	tan sand	O DAL	O DAL	
96239-07	8/26/1996	96239-07	soil	861762.125	432595.9375	Lead	46.6	10.7	4.52	0	1	0	0	0	0 grab	tan sand	O DAL	O DAL	
96239-09	8/26/1996	96239-09	soil	861800.125	432632.9375	Lead	215	10.5	8.71	0	1	0	0	0	0 grab	tan, trace brown sand	O DAL	O DAL	
96239-14	8/26/1996	96239-14	soil	861742.125	432713.9375	Lead	45.7	10.6	8.21	0	1	0	0	0	0 grab	tan sand	O DAL	O DAL	
96239-15	8/26/1996	96239-15	soil	861759.125	432735.9375	Lead	44.4	10.7	8.43	0	1	0	0	0	0 grab	tan sand	O DAL	O DAL	
96247-NRA-101	9/3/1996	96247-NRA-101	soil	861754.0625	432697.0038	Lead	284	10.8	2.88	0	1	2	0	0	0 comp	post excavation, 3-pt composite, brown/grey sand, e. sidewall	O DAL	O DAL	
96247-NRA-102	9/3/1996	96247-NRA-102	soil	861745.0625	432683.0403	Lead	234	10.9	2.88	0	1	2	0	0	0 comp	post excavation, 3-pt composite, brown/grey sand, s. sidewall	O DAL	O DAL	
96248-10	9/4/1996	96248-10	soil	861754.125	432670.9375	Lead	412	11.2	4.02	0	1	0	0	0	0 grab	dark brown sand with loamy material	O DAL	O DAL	
96254-NWF-01	9/10/1996	96254-NWF-01	soil	861745.0625	432390.1563	Lead	0	11.5	5.72	U	0.5	1.3	1	0	0 comp	post excavation, 5-pt composite, brown sand with some black stained sand, hydrocarbon odor, bottom	O DAL	O DAL	
96254-NWF-02	9/10/1996	96254-NWF-02	soil	861751.125	432440.9375	Lead	22.1	11.1	3.77	0	1	1	0	0	0 comp	post excavation, 5-pt composite, brown and orange sand, bottom	O DAL	O DAL	
96255-NWF-03	9/11/1996	96255-NWF-03	soil	861744.9375	432338.125	Lead	25.2	11.7	3.77	0	0.8	1	0	0	0 grab	post excavation, 5-pt composite, brown sand, bottom	O DAL	O DAL	
96256-NWF-04	9/12/1996	96256-NWF-04	soil	861886.3125	432439.5625	Lead	131	11.2	5.53	0	0.8	1	0	0	0 comp	post excavation, 5-pt composite, brown sand, bottom	O DAL	O DAL	
96256-NWF-05	9/12/1996	96256-NWF-05	soil	861700.125	432360.9375	Lead	0	11.4	5.72	U	0.5	0.8	1	0	0 comp	post excavation, 5-pt composite, brown sand, bottom	O DAL	O DAL	
96260-NWF-06	9/16/1996	96260-NWF-06	soil	861637.5	432349.1563	Lead	104	12.6	3.02	0	0.8	1	0	0	0 comp	post excavation, 5-pt composite, brown sand, bottom	O DAL	O DAL	
96260-NWF-07	9/16/1996	96260-NWF-07	soil	861648	432389.6563	Lead	171	11.1	3.73	0	0.8	1	0	0	0 comp	post excavation, 5-pt composite, brown sand, bottom	O DAL	O DAL	
96262-NWF-09	9/18/1996	96262-NWF-09	soil	861594.8125	432437.7913	Lead	0	11.2	5.82	U	0.5	1	1	0	0 comp	post excavation, 5-pt composite, brown sand, bottom	O DAL	O DAL	
96262-NWF-11	9/18/1996	96262-NWF-11	soil	861602.125	432466.9375	Lead	1.93	11	1.53	0	1	2	0	0	0 comp	post excavation, 3-pt composite, brown sand, n. sidewall	O DAL	O DAL	
96263-NWF-16	9/19/1996	96263-NWF-16	soil	861664.3125	432503.5939	Lead	13.8	11.6	13.61	0	0.8	1	0	0	0 comp	post excavation, 5-pt composite, brown sand, bottom	O DAL	O DAL	
96263-NWF-18	9/19/1996	96263-NWF-18	soil	861633.5625	432518.4063	Lead	57.4	10.3	7.43	0	0.5	2	0	0	0 comp	post excavation, 5-pt composite, brown sand, bottom	O DAL	O DAL	
96268-03	9/24/1996	96268-03	soil	861891.125	432400.9375	Lead	107	10.9	3.77	0	1	0	0	0	0 grab	brown sand	O DAL	O DAL	
96268-05	9/24/1996	96268-05	soil	861878.125	432341.9375	Lead	157	11.1	3.77	0	1	0	0	0	0 grab	tan to brown sand	O DAL	O DAL	
96268-07	9/24/1996	96268-07	soil	861802.125	432355.9375	Lead	325	11.4	3.85	0	1	0	0	0	0 grab	tan to brown sand trace clinker	O DAL	O DAL	
96268-09	9/24/1996	96268-09	soil	861797.125	432399.9375	Lead	16.6	11.1	3.83	0	1	0	0	0	0 grab	tan sand clinker	O DAL	O DAL	
96275-NREA-01	10/1/1996	96275-NREA-01	soil	861828.8125	432407.0313	Lead	26.3	11.7	2.93	0	2.5	1	1	0	0 comp	post ex bottom 4 pt.	O DAL	O DAL	
96285-NREA-02	10/1/1996	96285-NREA-02	soil	861877.9375	432556.7813	Lead	77.1	11.7	7.33	0	1.5	1	1	0	0 comp	post excavation (bottom), 5-pt composite, brown sand	O DAL	O DAL	
96290-03	10/16/1996	96290-03	soil	861663.125	432570.9375	Lead	436	11.5	3.86	0	1	0	0	0	0 grab	brown sand with root debris	O DAL	O DAL	
96291-09	10/17/1996	96291-09	soil	861769.125	432552.9375	Lead	629	12.6	5.76	0	0	0	0	0	0 comp	4-pt composite, brown coarse wet sand with brick fragments	O DAL	O DAL	
96303-NWF-29	10/29/1996	96303-NWF-29	soil	861670.8125	432556.0398	Lead	15.4	10.6	18.43	0	1.3	2	0	0	0 comp	post excavation 3-pt west sidewall	O DAL	O DAL	
ACT-0	1/10/1995	ACT	soil	861594.125	432558.9375	Lead	25.1	0	2.51	0	2	0	0	0	0 grab	O Col			
GPT-10-1	3/23/1995	GPT-10	soil	861951.5	432397	Lead	346	0	3.46	0	2	0	0	0	0 grab	O Sev			
GPT-11-1	3/23/1995	GPT-11	soil	861926.3125	432398.25	Lead	63.9	0	6.94	0	2	0	0	0	0 grab	O Sev			
GPT-12-1	3/23/1995	GPT-12	soil	861897.5	432401.7188	Lead	122	0	12.1	0	2	0	0	0	0 grab	O Sev			
GPT-20-1	3/23/1995	GPT-20	soil	861964.4375	432495.9063	Lead	124	0	12.04	0	2	0	0	0	0 grab	O Sev			
GPT-21-1	3/23/1995	GPT-21	soil	861938.8125	432498.1563	Lead	93.4	0	9.54	0	2	0	0	0	0 grab	O Sev			
GPT-22-1	3/23/1995	GPT-22	soil	861909.5625	432500.8125	Lead	185	0	19.98	0	2	0	0	0	0 grab	O Sev			
GPT-31-1	3/23/1995	GPT-31	soil	861946.8125	432595.375	Lead	821	0	8.21	0	2	0	0	0	0 grab	O Sev			
GPT-32-1	3/23/1995	GPT-32	soil	861923.125	432600.9688	Lead	931	0	8.31	0	2	0	0	0	0 grab	O Sev			
GPT-41-1	3/23/1995	GPT-41	soil	861965.1975	432695.8438	Lead	63.8	0	6.38	0	2	0	0	0	0 grab	O Sev			
GPT-42-1	3/23/1995	GPT-42	soil	861936.4375	432702.5	Lead	393	0	8.93	0	2	0	0	0	0 grab	O Sev			

## Including Hardscape

Avg_Pb	Most Common	Backfill/Soil	Portion of	Incomplete	Ecological	Weighted Avg_Pb
Concentration	Detection Limit	Grid Cell Area	Cover Area	Hardscape	Exposure Area	Concentration
(ppm)	(ppm)	(ac)	(ac)	(ac)	(ac)	(ppm)
183	11.3	4.00	1.74	0.29	50.8%	49.2%
					50.6%	92.9

ED\_006371\_00000951-00144

**Group 14: Grids 89, 90, 99, 100**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_SD1	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_L
08101-AC-3	4/10/2008	AC-3	soil	862021.0625	432384.9375	Lead	742	0.43	747		0	0.5	0	0	0 grab	Upland	2008	S	0 CAS	
08101-HG-3	4/10/2008	HG-3	soil	862017	432520.8438	Lead	9.69	0.01999	9.68		0	0.5	0	0	0 grab	Upland	2008	S	0 CAS	
08101-PB-3	4/10/2008	PB-3	soil	862250	432686.3438	Lead	5.54	0.01999	5.52		0	0.5	0	0	0 grab	Upland	2008	S	0 CAS	
08102-AC-3-C	4/11/2008	AC-3	soil	862021.0625	432384.9375	Lead	38.6	0.01999	38.6		0	0.5	0	0	0 composite	Upland	2008	S	0 CAS	
08102-HG-3-C	4/11/2008	HG-3	soil	862017	432520.8438	Lead	10.2	0.01999	10.2		0	0.5	0	0	0 composite	Upland	2008	S	0 CAS	
08102-PB-3-C-R1	4/11/2008	PB-3	soil	862250	432686.3438	Lead	11.1	0.01999	11.1		0	0.5	0	0	0 composite	Upland	2008	S	0 CAS	
08102-PB-3-C-R2	4/11/2008	PB-3	soil	862250	432686.3438	Lead	37.6	0.01999	37.6		0	0.5	0	0	0 composite	Upland	2008	S	0 CAS	
09129-SL12-0-2	5/9/2009	SL-12	soil	862156.5625	432652.0313	Lead	1.38	0.05	1.38		0	2	0	0	0 grab	May 2009 Upl		0	CAS	
96233-07	8/22/1996	96235-07	soil	862200.125	432405.9375	Lead	55.3	11.6	55.3		0	1	0	0	brown sand			0	QAL	
96235-09	8/22/1996	96235-09	soil	862183.125	432383.9375	Lead	426	11.4	426		0	1	0	0	brown sand			0	QAL	
96235-11	8/22/1996	96235-11	soil	862183.125	432337.9375	Lead	42.5	11.3	42.5		0	1	0	0	brown sand			0	QAL	
96247-11	9/3/1996	96247-11	soil	86208.125	432511.9375	Lead	51.7	10.8	51.7		0	1	0	0	dark brown sand with petroleum stains, petroleum odor			0	QAL	
96247-14	9/3/1996	96247-14	soil	862011.125	432422.9375	Lead	223	10.9	223		0	1	0	0	brown sand with some grey			0	QAL	
96256-05	9/12/1996	96256-05	soil	862038.125	432752.9375	Lead	44.1	11.8	44.1		0	1	0	0	light to medium brown sand			0	QAL	
96256-07	9/12/1996	96256-07	soil	862012.125	432752.9375	Lead	83	11.9	83		0	1	0	0	tan to brown sand			0	QAL	
96262-01	9/18/1996	96262-01	soil	862251	432563.4375	Lead	33.8	11.6	33.8		0	1	0	0	brown sand with trace hardened black material			0	QAL	
96262-12	9/18/1996	96262-12	soil	862330.3125	432745.9375	Lead	128	11.3	128		0	1	0	0	brown to tan sand, trace black hardened material			0	QAL	
96262-14	9/18/1996	96262-14	soil	862230.625	432730.25	Lead	1920	11.4	1920		0	1	0	0	black cinder-like material with trace debris			0	QAL	
96269-bcf-03	9/25/1996	96269-BCF-03	soil	862013.875	432741.875	Lead	321	11.6	321		0	2	2	0	post excavation west sidewall 3-pt			0	QAL	
96277-06	10/3/1996	96277-06	soil	862145.625	432578.75	Lead	62.6	11.6	62.6		0	1	0	0	lt brown sand organic material			0	QAL	
96277-09	10/3/1996	96277-09	soil	862156.3125	432672.5625	Lead	53.7	11.5	53.7		0	1	0	0	dirt pile, brn sand organic mat., clinker			0	QAL	
96277-28	10/3/1996	96277-28	soil	862215.125	432720.9375	Lead	1100	14.1	1100		0	1	0	0	brn loamy sand			0	QAL	
96277-29	10/3/1996	96277-29	soil	862262.125	432730.9063	Lead	80.9	11.4	80.9		0	1	0	0	reddish tan sand			0	QAL	
96284-09	10/10/1996	96284-09	soil	862217.125	432692.9375	Lead	232	15.8	232		0	1	0	0	brown wet sand with organic material			0	QAL	
96290-04	10/16/1996	96290-04	soil	862141.125	432556.9375	Lead	33.6	11.6	33.6		0	1	0	0	brown sand with root debris			0	QAL	
96312-07	11/7/1996	96312-07	soil	862060.125	432745.9375	Lead	160	11	160		0	1	0	0	brown sand			0	QAL	
96318-SBC-03	11/13/1996	96318-SBC-03	soil	862204.125	432513.9375	Lead	26.3	11.2	26.3		0	2	2	0	comp	post excavation 3-pt north sidewall		0	QAL	
96327-01	11/22/1996	96327-01	soil	862298.125	432678.9063	Lead	169	11.6	169		0	1	0	0	brown sand with gravel size hard black material			0	QAL	
96327-02	11/22/1996	96327-02	soil	862248.125	432738.9063	Lead	249	11.5	249		0	1	0	0	orange-brown sand, organics, brick pieces			0	QAL	
97028-08	1/28/1997	97028-08	soil	862274.125	432421.9063	Lead	368	11.9	368		0	1.7	2	0	comp	post excavation north sidewall 3-pt		0	QAL	
97028-10	1/28/1997	97028-10	soil	862286.125	432397.9063	Lead	48.2	11.9	48.2		0	1.8	2	0	comp	post excavation east sidewall 3-pt		0	QAL	
97034-07	2/3/1997	97034-07	soil	862098.125	432407.9375	Lead	34.4	11.5	34.4		0	1	0	0	characterization NE corner locker room			0	QAL	
97036-03	2/5/1997	97036-03	soil	862280.125	432467.9063	Lead	541	11.1	541		0	1	0	0	characterization east side boiler house			0	QAL	
97069-NCA-07	3/10/1997	97069-NCA-07	soil	862145.125	432602.9375	Lead	99.1	10.9	99.1		0	1.5	2	0	comp	post excavation E sidewall 3-pt		0	QAL	
97071-02	3/12/1997	97071-02	soil	862070.125	432491.9375	Lead	111	10.3	111		0	0.1	0	0	comp	surface samples 5-pt		0	QAL	
97071-03	3/12/1997	97071-03	soil	862030.125	432507.9375	Lead	85.1	10.6	85.1		0	0.1	0	0	comp	surface samples 5-pt		0	QAL	
97071-04	3/12/1997	97071-04	soil	862236.125	432543.9375	Lead	167	10.8	167		0	0.1	0	0	comp	surface samples 5-pt		0	QAL	
97071-NCA-16	3/12/1997	97071-NCA-16	soil	862150.125	432665.9375	Lead	66.2	10.7	66.2		0	1.7	2	0	comp	post excavation E sidewall 3-pt		0	QAL	
97072-NCA-22	3/13/1997	97072-NCA-22	soil	862078.125	432459.9375	Lead	76.6	10.6	76.6		0	1	2	0	comp	post excavation S sidewall 3-pt		0	QAL	
97076-01	3/17/1997	97076-01	soil	862295.625	432637.4063	Lead	197	11.2	197		0.3	0.5	1	0	comp	post excavation bottom 5-pt, scrape area		0	QAL	
97076-NCA-26	3/17/1997	97076-NCA-26	soil	862088.625	432752.5313	Lead	52.4	10.6	52.4		0	1	2	0	comp	post excavation W sidewall 3-pt		0	QAL	
97128-01	5/8/1997	97128-01	soil	862318.125	432589.9063	Lead	54.6	10.8	54.6		0	0.1	0	0	comp	road sample 5-pt		0	QAL	

*Including Hardscape*

Avg. Pb Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Pb Concentration (ppm)
196	11.3	4.00	1.21	0.70	47.6%	52.4%	106

**Group 15: Grids 93, 94, 103, 104**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_1
LC-207-SLA	10/14/1994	LC-207	soil	863031.125	432373.9063	Lead	230	0	230	0	1	0	0	0 comp			0 ESD			
LC-208-SLA	10/14/1994	LC-208	soil	863061.125	432474.9063	Lead	89	0	89	0	1	0	0	0 comp			0 ESD			
LC-209-SLA	10/15/1994	LC-209	soil	863065.125	432533.9063	Lead	26	0	26	0	1	0	0	0 comp			0 ESD			
LC-210-SLA	10/15/1994	LC-210	soil	863076.125	432611.9063	Lead	34	0	34	0	1	0	0	0 comp			0 ESD			
LC-211-SLA	10/19/1994	LC-211	soil	863074.125	432668.9063	Lead	73	0	73	0	1	0	0	0 comp			0 ESD			
LC-213-SLA	10/15/1994	LC-213	soil	862857.125	432525.9063	Lead	5.3	0	5.3	0	1	0	0	0 comp			0 ESD			
LC-214-SLA	10/15/1994	LC-214	soil	862902.125	432685.9063	Lead	94	0	94	0	1	0	0	0 comp			0 ESD			

Avg. Pb Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Incomplete Hardscape (ac)	Ecological Exposure Area (ac)	Weighted Avg. Pb Concentration (ppm)
78.8	11.3	3.01	1.38	0.00	45.7%	54.3%

**Group 16: Grids 105, 106, 113, 114**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5SD	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_1
96232-03	8/19/1996	96232-03	soil	861922.125	433065.9375	Lead	27.2	10.9	27.2	0	1	0	0	grab	hard tar at surface, brown sand with hydrocarbon odor	0	QAL		metal	
96232-09	8/19/1996	96232-09	soil	861947.125	433062.9375	Lead	12.5	10.9	12.5	0	1	0	0	grab	light brown sand	0	QAL		metal	
96290-NRA-119	10/16/1996	96290-NRA-119	soil	861900.188	433133.125	Lead	65.9	12.1	65.9	0	1.3	2	0	comp	post excavation (s. sidewall), 3-pt composite	0	QAL		metal	
97020-NREA-30	1/20/1997	97020-NREA-30	soil	861898.125	433047.9375	Lead	98.7	11.7	98.7	0	2	2	0	comp	post excavation 3-pt north sidewall	0	QAL		metal	
97021-NREA-35	1/21/1997	97021-NREA-35	soil	861854.125	433041.9375	Lead	418	11.3	418	0.5	0.5	1	0	comp	post excavation 5-pt bottom	0	QAL		metal	
97021-NREA-36	1/21/1997	97021-NREA-36	soil	861840.125	433009.9375	Lead	366	11.5	366	0.5	0.5	1	0	comp	post excavation 5-pt bottom	0	QAL		metal	
97049-10	2/18/1997	97049-10	soil	861926.125	432933.9375	Lead	44.6	11.2	44.6	0.1	0.1	1	0	comp	power screen scrape area 5-pt	0	QAL		metal	
97058-09	2/27/1997	97058-09	soil	861946.125	432975.9375	Lead	186	11.2	186	0	0.1	1	0	comp	scrape in backfill @ pugmill area	0	QAL		metal	
97066-01	3/7/1997	97066-01	soil	861884.125	433065.9375	Lead	299	10.9	299	0	0.1	0	0	grab	soil @ concrete tank supports	0	QAL		metal	
97066-02	3/7/1997	97066-02	soil	861880.125	433091.9375	Lead	996	12.6	996	0	0.1	0	0	grab	soil @ concrete tank supports	0	QAL		metal	
97066-03	3/7/1997	97066-03	soil	861891.125	433117.9375	Lead	3650	11.4	3650	0	0.1	0	0	grab	soil @ concrete tank supports	0	QAL		metal	
LC-201-SLA	10/17/1994	LC-201	soil	861887.125	433090.9375	Lead	190	0	190	0	1	0	0	comp	Characterization	0	ESD		metal	

Avg. Pb Concentration (ppm)	Weighted Avg.							
	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Pb Concentration (ppm)	
529	11.3	3.16	2.22	0.00	70.2%	29.8%	162	

**Group 17: Grids 107, 108, 115, 116**

SAMPLE_ID	DATE_SAMP	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_J
96213-14	7/31/1996	96213-14	soil	862039.125	432865.9375	Lead	374	11.6	374	0	0.1	0	0	0	comp	5-pt composite surface samples from roads at north side of site	0	QAL	metal	
96213-15	7/31/1996	96213-15	soil	862396.125	430309.9063	Lead	124	10.3	124	0	0.1	0	0	0	comp	5-pt composite surface samples from roads at north side of site	0	QAL	metal	
96213-16	7/31/1996	96213-16	soil	862346.125	432761.9063	Lead	198	10.5	198	0	0.1	0	0	0	comp	5-pt composite surface samples from roads at north side of site	0	QAL	metal	
96260-05	9/16/1996	96260-05	soil	862285.1875	433148.9063	Lead	26.3	10.8	26.3	0	1	0	0	0	grab	brown sand with trace tan sand	0	QAL	metal	
96260-07	9/16/1996	96260-07	soil	862383.625	433131.5625	Lead	67.2	11.2	67.2	0	1	0	0	0	grab	brown sand with debris (i.e., brick, ballast)	0	QAL	metal	
96260-09	9/16/1996	96260-09	soil	862369.4375	433021.4375	Lead	33.9	10.4	33.9	0	1	0	0	0	grab	brown loamy sand with root debris	0	QAL	metal	
96260-11	9/16/1996	96260-11	soil	862288.3125	433031.1875	Lead	513	11.1	513	0	1	0	0	0	grab	dark brown sand	0	QAL	metal	
96260-13	9/16/1996	96260-13	soil	862233.3125	433039.9375	Lead	18.7	11.4	18.7	0	1	0	0	0	grab	tan sand with rust stains	0	QAL	metal	
96260-15	9/16/1996	96260-15	soil	862352.375	432927.1563	Lead	49.2	11.1	49.2	0	1	0	0	0	grab	dark brown sand with loamy material	0	QAL	metal	
96261-15	9/17/1996	96261-15	soil	862272.125	432960.0625	Lead	218	10.6	218	0	1	0	0	0	grab	brown loamy sand	0	QAL	metal	
96261-18	9/17/1996	96261-18	soil	862214.5	432953.625	Lead	19.5	11.1	19.5	0	1	0	0	0	grab	brown sand with trace tan sand	0	QAL	metal	
96261-20	9/17/1996	96261-20	soil	862343.8125	432825.1875	Lead	189	11.3	189	0	1	0	0	0	grab	dark brown loamy sand with root debris	0	QAL	metal	
96262-10	9/18/1996	96262-10	soil	862043.125	432783.9375	Lead	78.5	10.7	78.5	0	1	0	0	0	grab	brown sand	0	QAL	metal	
96263-01	9/19/1996	96263-01	soil	862279.125	432820.625	Lead	3000	11.6	3000	0	0.5	0	0	0	grab	dark brown loamy sand with root debris and whit/beige fibrous material	0	QAL	metal	
96263-02	9/19/1996	96263-02	soil	862179.75	432828.3125	Lead	205	11.5	205	0	1	0	0	0	grab	light brown to tan sand	0	QAL	metal	
96263-04	9/19/1996	96263-04	soil	862105	432877.3438	Lead	234	11.7	234	0	1	0	0	0	grab	light brown loamy sand	0	QAL	metal	
96267-01	9/23/1996	96267-01	soil	862249.25	433152	Lead	105	11	105	0	1	0	0	0	grab	brown to tan loamy sand	0	QAL	metal	
96277-16	10/3/1996	96277-16	soil	862187.75	432754.4375	Lead	305	11.7	305	0	1	0	0	0	grab	brown sand	0	QAL	metal	
96277-24	10/3/1996	96277-24	soil	862233.5625	433100.9688	Lead	69	11.2	69	0	1	0	0	0	grab	brown sand organic material	0	QAL	metal	
96277-26	10/3/1996	96277-26	soil	862279.125	432835.625	Lead	520	12.7	520	0	1	0	0	0	grab	brn loamy sand white crumbly mat.	0	QAL	metal	
96277-27	10/3/1996	96277-27	soil	862299.125	432820.625	Lead	876	13.9	876	0	1	0	0	0	grab	brn sand organic material	0	QAL	metal	
96284-01	10/10/1996	96284-01	soil	862316.125	432822.9063	Lead	653	12.5	653	0	1	0	0	0	grab	brown to black sand, small stones, granular metal fragments	0	QAL	metal	
96284-03	10/10/1996	96284-03	soil	862282.125	432865.9063	Lead	347	13.8	347	0	0.5	0	0	0	grab	brown wet sand, organic debris	0	QAL	metal	
96284-08	10/10/1996	96284-08	soil	862172.125	432806.9375	Lead	86.2	12.2	86.2	0	1	0	0	0	grab	brown sand with organic material	0	QAL	metal	
96304-01	10/30/1996	96304-01	soil	862065.125	432757.3438	Lead	246	11.3	246	0	1	0	0	0	grab	delineation hand auger sample	0	QAL	metal	
96304-05	10/30/1996	96304-05	soil	862144.125	432784.9375	Lead	46.2	10.9	46.2	0	1	0	0	0	grab	delineation hand auger sample	0	QAL	metal	
96304-06	10/30/1996	96304-06	soil	862192.125	432774.9375	Lead	137	11	137	0	1	0	0	0	grab	delineation hand auger sample	0	QAL	metal	
96304-07	10/30/1996	96304-07	soil	862246.125	432784.9063	Lead	4430	11.8	4430	0	1	0	0	0	grab	delineation hand auger sample	0	QAL	metal	
96319-NCA-04	11/14/1996	96319-NCA-04	soil	862215.875	433093.5938	Lead	231	12.4	231	0	1.5	2	0	0	comp	post excavation 3-pt south sidewall	0	QAL	metal	
96319-NCA-05	11/14/1996	96319-NCA-05	soil	862240	433156.125	Lead	29	11	29	0	1.5	2	0	0	comp	post excavation 3-pt east sidewall	0	QAL	metal	
96327-03	11/22/1996	96327-03	soil	862238.125	432758.9063	Lead	265	11.2	265	0	1	0	0	0	grab	black hard granular material and brown sand	0	QAL	metal	
96327-04	11/22/1996	96327-04	soil	862358.125	432788.9063	Lead	176	11.1	176	0	1	0	0	0	grab	brown sand with gravel size hard black material	0	QAL	metal	
96327-06	11/22/1996	96327-06	soil	862298.125	432848.9063	Lead	559	11.5	559	0	0.5	0	0	0	grab	brown loamy sand, organics, white gravel size material	0	QAL	metal	
96327-07	11/22/1996	96327-07	soil	862248.125	432838.9063	Lead	95.6	10.5	95.6	0	1	0	0	0	grab	gray fibrous material, brown loamy sand	0	QAL	metal	
96327-08	11/22/1996	96327-08	soil	862348.125	432958.9063	Lead	239	11.3	239	0	1	0	0	0	grab	dark brown loamy sand, organics	0	QAL	metal	
96327-09	11/22/1996	96327-09	soil	862298.125	432968.9063	Lead	74.7	11.3	74.7	0	1	0	0	0	grab	black hard granular material & brown sand	0	QAL	metal	
96327-10	11/22/1996	96327-10	soil	862288.125	432998.9063	Lead	122	11.5	122	0	1	0	0	0	grab	black hard granular material & tan sand	0	QAL	metal	
96327-11	11/22/1996	96327-11	soil	862308.125	432998.9063	Lead	218	11.1	218	0	1	0	0	0	grab	brown loamy sand, organics	0	QAL	metal	
97058-08	2/27/1997	97058-08	soil	861996.125	432943.9375	Lead	14.5	11.1	14.5	0	0.1	1	0	0	comp	scrape in backfill @ pugmill area	0	QAL	metal	
97071-NCA-19	3/12/1997	97071-NCA-19	soil	862174.125	432791.9375	Lead	97.2	10.3	97.2	0	1	2	0	0	comp	post excavation N sidewall 3-pt	0	QAL	metal	
97072-01	3/13/1997	97072-01	soil	862054.125	432929.9375	Lead	501	11.3	501	0	0.3	1	0	0	comp	scrape area 5-pt	0	QAL	metal	
97072-02	3/13/1997	97072-02	soil	862054.125	432791.9375	Lead	220	10.6	220	0	0.3	1	0	0	comp	scrape area 5-pt	0	QAL	metal	
97076-NCA-25	3/17/1997	97076-NCA-25	soil	862104.4375	432761.125	Lead	105	11	105	0.5	1	1	0	0	comp	post excavation 5-pt bottom	0	QAL	metal	
97128-02	5/8/1997	97128-02	soil	862350.125	432803.9063	Lead	51	10.4	51	0	0.1	0	0	0	comp	road sample 5-pt	0	QAL	metal	
97128-03	5/8/1997	97128-03	soil	862376.125	433013.9063	Lead	104	11.9	104	0	0.1	0	0	0	comp	road sample 5-pt	0	QAL	metal	
97128-04	5/8/1997	97128-04	soil	862396.125	433169.9063	Lead	124	10.1	124	0	0.1	0	0	0	comp	road sample 5-pt	0	QAL	metal	

Avg. Pb Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Portion of Hardscape (ac)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Pb Concentration (ppm)	Weighted Avg.
356	11.3	4.00	1.52	0.00	38.1%	61.9%	223	

**Group 18: Grids 124, 125, 133, 134**

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB	TYPE_1
96337-NRA-135	12/2/1996	96337-NRA-135	soil	862004.125	433274.1563	Lead	507	12.2	50.7	0	2	2	0	comp	post excavation 3-pt south sidewall	0	QAL	metal		
96319-NCA-06	11/14/1996	96319-NCA-06	soil	862227.0625	433205.0313	Lead	132	10.7	33.2	0	1.3	2	0	comp	post excavation 3-pt north sidewall	0	QAL	metal		
96312-12	11/7/1996	96312-12	soil	862080.125	433247.9375	Lead	207	11.9	20.7	0	1	0	0	grab	brown sand with black hard material	0	QAL	metal		
96312-10	11/7/1996	96312-10	soil	862164.125	433235.9375	Lead	81.2	11.4	8.1	0	1	0	0	grab	brown sand with black hard material	0	QAL	metal		
96298-01	10/24/1996	96298-01	soil	862191.125	433271.9375	Lead	71.5	10.9	7.1	0	1	0	0	grab	delineation sample	0	QAL	metal		
96296-10	10/22/1996	96296-10	soil	862223.125	433337.9063	Lead	327	11.5	32.7	0	1	0	0	grab	delineation sample	0	QAL	metal		
96296-08	10/22/1996	96296-08	soil	862220.125	433288.9063	Lead	24.8	11.3	24.8	0	1	0	0	grab	delineation sample	0	QAL	metal		
96277-20	10/3/1996	96277-20	soil	862251.1875	433229.375	Lead	42.9	11.1	42.9	0	1	0	0	grab	brown sand loamy	0	QAL	metal		
96277-18	10/3/1996	96277-18	soil	862221.1875	433229.4063	Lead	91.6	11	91.6	0	1	0	0	grab	brown sand trace clinker	0	QAL	metal		
96242-09	8/29/1996	96242-09	soil	862015.125	433461.9375	Lead	922	13.5	92.2	0	1	0	0	grab	brown sand, petroleum odor	0	QAL	metal		
96242-08	8/29/1996	96242-08	soil	862024.125	433478.9375	Lead	1580	17.7	158.0	0	1	0	0	grab	brown sand, organic debris	0	QAL	metal		
96242-07	8/29/1996	96242-07	soil	862045.125	433535.9375	Lead	832	17.8	83.2	0	1	0	0	grab	brown sand, grey flakes	0	QAL	metal		

Avg. Pb Concentration (ppm)	Most Common Detection Limit (ppm)	Grid Cell Area (ac)	Backfill/Soil Cover Area (ac)	Incomplete Hardscape (ac)	Ecological Exposure Area (ac)	Pb Concentration (ppm)	Weighted Avg.
402	11.3	3.28	1.07	0.00	32.8%	67.2%	272



## **APPENDIX D**

### **Time-Dependent Dose-Response Analysis in Derivation of Preliminary Remedial Goal for Inorganic Mercury**

## APPENDIX D

### Time-Dependent Dose-Response Analysis Derivation of Preliminary Remedial Goal for Inorganic Mercury

This appendix describes the derivation of the preliminary remedial goal (“PRG”) protective of small mammal populations infrequently exposed to inorganic mercury in soil from United States Environmental Protection Agency (“USEPA”) comment on the 4-acre Local Assessment Population Area (“LAPA”) analysis in the revised draft of the FS Tech Memo (letter dated on December 6, 2018). The USEPA resolves an infrequent exposure as the weighted average of chronic<sup>1</sup> and sub-chronic<sup>2</sup> exposure based on the relative frequency of exposure to soil that may cause chronic toxicity and sub-chronic toxicity. USEPA applies 10% exposure to the sub-chronic exposure dose and 90% exposure to the chronic exposure dose.

The analysis herein applies the concepts of Druckrey and Küpfmüller (Druckrey and Küpfmüller, 1949) validated for a number of toxic inorganic and organic chemicals (Tennekes and Sánchez-Bayo, 2013; Pletz et al. 2016) to describe the dose-response characteristics of inorganic mercury induced reproductive effects or changes in body weight in small mammals. The Druckrey-Küpfmüller equation is presented below:

$$\text{constant} = dt^n$$

where “d” is the exposure dose, “t” is exposure time-to-effect (or latency period), and “n” is an exposure time reinforcement factor. Compounds showing irreversible binding or slowly dissociate from the specific receptors will enhance (or reinforce) effects with time of exposure ( $n > 1$ ). The effects of non-specific binding compounds or slowly reversible binding compounds that do not contribute to toxicity are more readily expressed at higher exposure concentrations, with time having a minor influence ( $n < 1$ ).

The lowest observable adverse effect (“LOAEL”) TRVs for rats reporting effects on reproduction or body weight due to oral exposure to inorganic mercury were obtained from ten sources available in the scientific literature listed in the table below.

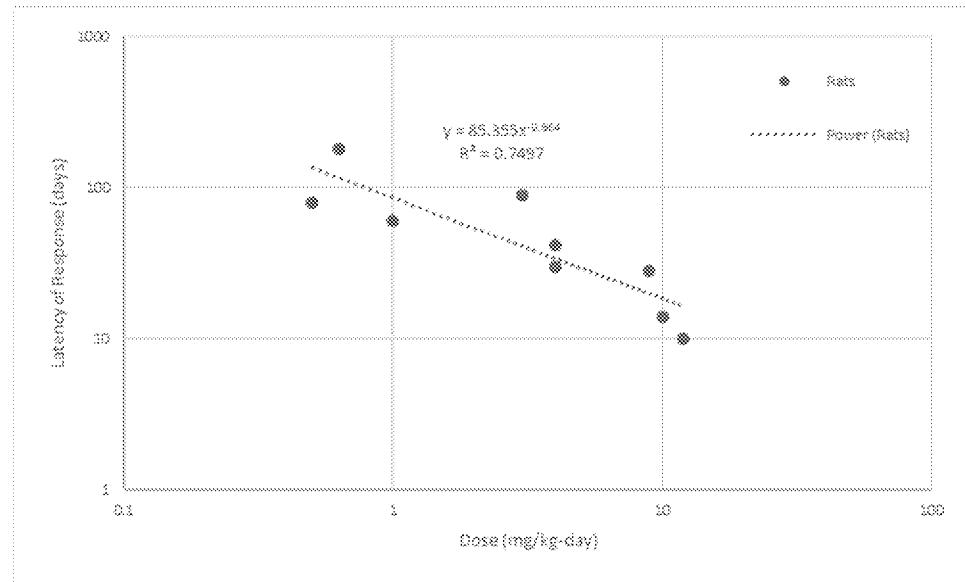
Reference	Species	Latency of Response (days)	LOAEL TRV (mg/kg-day)
Heath et al. 2009	Sprague-Dawley rat	60	1
Atkinson et al. 2001	Sprague-Dawley rat	80	0.5
NTP 1993	Male and female Fischer 344 rats	182	0.625
Boujbiha et al. 2009	Male Wistar rats	90	3
Jonker et al. 1993	Male Wistar rats	28	8.9
McAnulty et al. 1982	Pregnant rats	10	12
Pritchard et al. 1982	Pregnant rats	30	4
Dieter et al. 1992	Male & female F344 rats	14	10
Oliveira et al. 1996	Pregnant Wistar rats	42	4

These LOAEL TRVs were plotted against the latency of response and fit to the Druckrey-Küpfmüller

<sup>1</sup> The toxicity reference value (“TRV”) requested by USEPA in the Baseline Ecological Risk Assessment (“BERA”) (CDR and EPS, 2010) for protection of the short-tailed shrew chronically exposed to mercury was based on a 60-day exposure period.

<sup>2</sup> Subchronic exposure is defined as 10% of the lifespan of a rabbit (1.25 yrs), or approximately 46 days.

equation (see chart below) to determine a protective dose for infrequent exposure.



TRVs calculated from the Druckrey-Küpfmüller power function for chronic, sub-chronic, and infrequent exposure are listed in the table below.

Sub-chronic LOAEL TRV (mg/kg-day)	Chronic LOAEL TRV (mg/kg-day)	Infrequent Exposure (mg/kg-day)
2.5	1.7	1.8

A PRG of 14 mg/kg for infrequent exposure to inorganic mercury was back-calculated applying the 1.8 mg/kg-day LOAEL TRV to the formula below rearranged from the calculation of the target hazard quotient<sup>3</sup>:

$$PRG = \frac{THQ \times BW \times TRV}{SIR + (BAF_1 \times FF_1 \times FIR) + (BAF_2 \times FF_2 \times FIR)}$$

PRG: Preliminary remedial goal in soil, mercury (mg/kg)

THQ: Target hazard quotient (unitless), 1

BW: Body weight of the receptor (kg), 0.015

TRV: Toxicity value specific for mercury and receptor (mg/kg-day)

SIR: Soil ingestion rate (kg/day), 0.000066

BAF<sub>1</sub>: Bioaccumulation factor for insects (unitless), 0.036

FF<sub>1</sub>: Fraction of diet composed of insects (unitless), 0.6

BAF<sub>2</sub>: Bioaccumulation factor for earthworms (unitless), 2.1

FF<sub>2</sub>: Fraction of diet composed of earthworms (unitless), 0.4

FIR: Food intake (kg/day)

<sup>3</sup> Values used for the body weight of the receptor, soil ingestion rate, food intake, bioaccumulation factor for food items, and fraction of diet composed of food items are consistent with the BERA.

## References

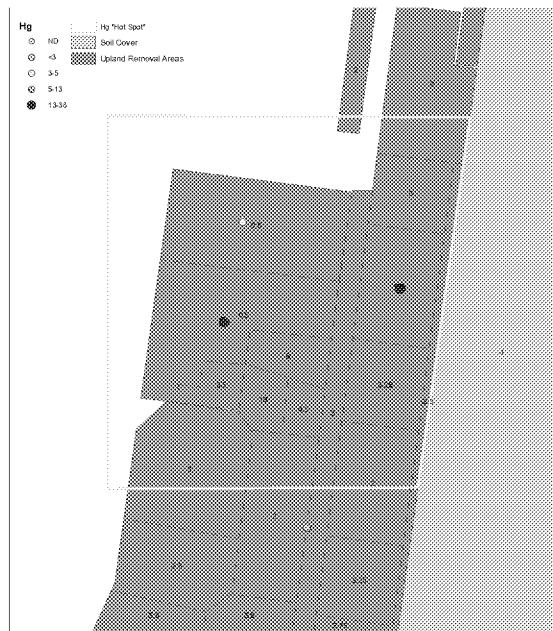
- Atkinson , A., Thompson, S.J., Khan, A.T., Graham, T.C., Ali, S., Shannon , C., Clarke, O. and L. Upchurch. 2001. Assessment of a Two-Generation Reproductive and Fertility Study of Mercuric Chloride In Rats. *Food and Chemical Toxicology* 39: 73-84.
- Boujbiha , M.A., Hamden, K.. Guermazi, F., Bouslama, A., Omezzine, A., Karnmoun, A., and A. El Feki. 2009. Testicular Toxicity in Mercuric Chloride Treated Rats: Association With Oxidative Stress. *Reproductive Toxicity* 28: 81-89.
- Dieter, M.P., Boorman, G.A., Jameson, C.W., Eustis, S.L. , and L.C . Uraihi. 1992. Development of Renal Toxicity In F344 Rats Gavaged With Mercuric Chloride For 2 Weeks, Or 2, 4, 6, 15, and 24 Months. *J. Toxicol. Environ. Health* 36(4): 319-340.
- Drukrey, H., and K. Küpfmüller. Dosis Und Wirkung-Beiträge Zur Theoretischen Pharmakologie. Freiburg im Breisgau, Germany: Cantor GmbH (1949).
- Environmental Planning Specialists, Inc. (EPS). 2010. Baseline Ecological Risk Assessment For The Upland At The LCP Chemical Site In Brunswick, Georgia. August.
- Heath, J.C. , Abdelmageed , Y., Brande N, T.D., Nichols, A.C., and D.A. Steffy. 2009. The Effects of Chronic Mercuric Chloride Ingestion in Female Sprague-Dawley Rats On Fertility and Reproduction. *Food and Chemical Toxicology* 47: 1600- 1605.
- Jonker, D., Woutersen , R.A ., Van Bladeren, P.J., Til, H .P., and V.J. Feron. 1993. Subacute (4-Wk) Oral Toxicity of A Combination of Four Nephrotoxins In Rats: Comparison With The Toxicity of The Individual Compounds. *Food Chem. Toxicol.* 31(2): 125-136.
- Mcanulty, P.A., Tesh, J.M., Pritchard, A.L., Wilby, O.K., and S.A. Tesh. 1982. Effects of Mercury On Fetal Development. *Teratology* 25:26A.
- NTP 1993. Toxicology and Carcinogenesis Studies of Mercuric Chloride (CAS No. 7487-94-7) In F344 Rats and B6C3F1 Mice (Gavage Studies). National Toxicology Program, Technical Report Series No. 408. U.S. Department of Health and Human Services, Public Health Service, National Institute of Health.  
[https://Ntp.Niehs.Nih.Gov/Ntp/Htdocs/Lt\\_Rpts/Tr408.Pdf](https://Ntp.Niehs.Nih.Gov/Ntp/Htdocs/Lt_Rpts/Tr408.Pdf)
- Oliveira, C.S., Oliveira, V.A., Ineu, R.P, Moraes-Silva, L., and M.E. Pereira. 2012. Biochemical Parameters of Pregnant Rats and Their Offspring Exposed to Different Doses of Inorganic Mercury In Drinking Water. *Food Chem. Toxicol.* 50: 2382-2378.
- Pletz, J., Sánchez-Bayo, F., and HA, Tennekes. 2016. Dose-Response Analysis Indicating Time-Dependent Neurotoxicity Caused by Organic and Inorganic Mercury- Implications For Toxic Effects In The Developing Brain. *Toxicology*. 347-349:1-5.
- Pritchard, A.L., M.J. Collier, P.A. Mcanulty, and J.M. Tesh. 1982. The Effects of Peri- and Post-Natal Exposure to Inorganic Mercury On Growth, Development and Behavior of Rats. *Teratology* 26:20A.
- Tennekes, Henk A., and Francisco Sánchez-Bayo. 2013. The Molecular Basis of Simple Relationships Between Exposure Concentration and Toxic Effects With Time. *Toxicology* 309 (2013): 39-51.



## **APPENDIX E**

### **Evaluation of Hot Spots for Ecological Exposure**

"Hot Spot" 1 (West of Cell Building Area)



Rem Area No.	Depth* (ft)	Area (sq ft)	Volume (cf)
1	2	737.6	1475.2
2	2	550.0	1100.1
3	2	1103.0	2206.0
4	2	1264.8	2529.5
5	1.5	1790.9	2686.3
6	2	1288.4	2576.8
7	2	965.6	1931.3
8	2	725.1	1450.2
9	2	1842.8	3685.6
10	0.5	3262.4	1631.2
11	0.5	3258.6	1629.3
12	2	709.4	1418.8
13	2	465.7	931.5
14	2	519.5	1038.9
15	2	396.5	793.0

Notes:

\* Up to 2 ft bgs

SAMPLE_ID	DATE_SAMPL	LOCATION	MATRIX	X_STATEPLA	Y_STATEPLA	PARAMETER	RESULT_PPM	DL_PPM	RESULT_0.5DL	R_MOD	D1	D2	POST_EX	EX_REMOVED	TYPE	DESCRIPTION	SAMPLING_E	DUP	LAB
96270-SRY-09	9/26/1996	96270-SRY-09	soil	861868.6875	431973.0625	Mercury	19.6	0.58999	18.8	0	1.5	1	0	comp	post excavation bottom 5-pt		0	QAL	
96262-CSA-02	9/18/1996	96262-CSA-02	soil	861791.0625	431957.9375	Mercury	14.6	0.6	7.3	0.5	0.8	1	0	comp	post excavation, 5-pt composite, grey/brown sand, bottom		0	QAL	
96261-CSA-01	9/17/1996	96261-CSA-01	soil	861799.5	432003.25	Mercury	4.28	0.6	2.5	0.5	0.5	1	0	comp	post excavation, 4-pt composite from sump		0	QAL	

Avg. Hg Concentration (ppm)	Most Common Detection Limit (ppm)	"Hot Spot" Volume (cf)	Backfill/Soil Cover Volume (cf)	Incomplete Exposure Area (ac)	Ecological Exposure Area (ac)	Weighted Avg. Hg Concentration (ppm)
12.8	0.57	50171	27084	54.0%	46.0%	6.1

**"Hot Spot" 2 (Former Brine Tank Area)**

